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Bozeman Arterials

North 19th Avenue — Oak Street M1299(1)
Kagy Boulevard M1212(4)

Project M 1299(1)

Final Environmental Impact / 4(f) Statement
FHWA-MT-EIS-86-01-F
October, 1986

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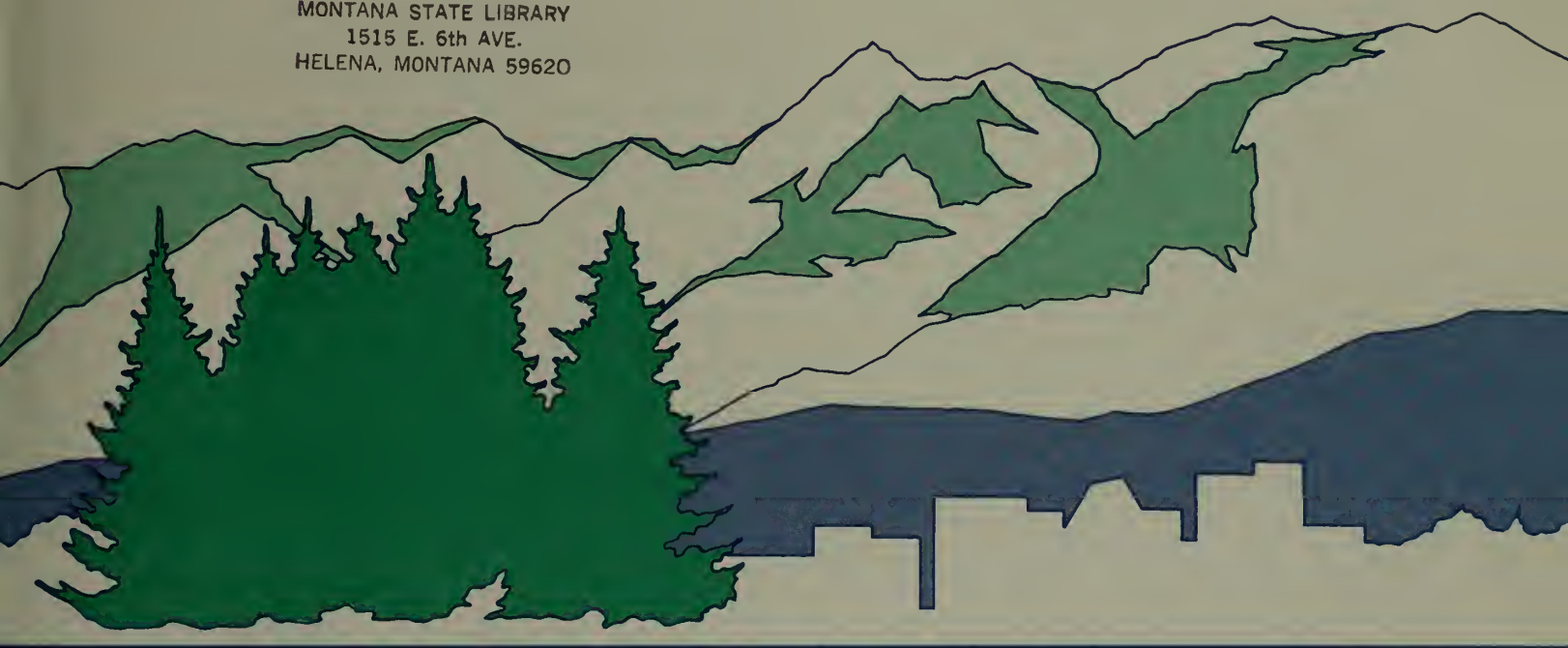

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Project M1299(1)
North 19th Avenue - Durston Road to Oak Street
Oak Street - North 19th Avenue to North Seventh Avenue
And
Project M1212(4)
Kagy Boulevard - South 19th to South Third Avenues
Bozeman, Montana

Final Environmental Impact/4(f) Statement

State of Montana
Department of Highways
and
U.S. Department of Transportation
Federal Highway Administration

Submitted pursuant to 42 U.S.C. 4332(2)(c), 23 U.S.C. 138 and 49 U.S.C. 303. This action complies with Executive Order 11990, "Protection of Wetlands."

for John L. Rubel
Gary Wicks
Montana Department of Highways

Date: October 16, 1986

Approved

Frank S. Allison
Federal Highway Administration

Date: 10/20/86

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Abstract of EIS

This Environmental Impact Statement addresses the impacts related to roadway development on two arterial routes in Bozeman, Montana. Project M1299(1) consists of acquiring right-of-way and constructing approximately 1.4 miles of roadway on North 19th Avenue (FAU 1201) and Oak Street (FAU 1202). Project M1212(4) consists of the acquisition of additional right-of-way and construction of 1.0 mile of roadway along Kagy Boulevard (FAU 1212). The projects are part of a perimeter arterial route around the City of Bozeman. In addition to these projects, this EIS addresses the impacts of extending North 19th Avenue from Oak Street to Baxter Lane. This road segment is not part of Project M1299(1), but its development is essential to ensure that the local road and street system in northwest Bozeman functions effectively. Several roadway alternatives consisting of no-build, two-lane, and four-lane designs were evaluated for each project. Analyses determined that North 19th Avenue (Durston Road to Oak Street) and Oak Street (North 19th to North Seventh Avenues) should be developed as four-lane roadways. The future traffic on Kagy Boulevard can be effectively handled by a two-lane roadway. Both projects will provide much needed traffic relief to segments of the local street network and will provide traffic facilities in rapidly developing portions of the community. Primary concerns identified during the preparation of this document include project funding and secondary impacts resulting from completion of these arterial links. To date, little opposition to the projects has been expressed.

The preferred alternative for North 19th Avenue - Oak Street was identified as a 78-foot-wide four lane roadway consisting of four 12-foot driving lanes, a 14-foot median, and two eight-foot emergency parking/bicycle lanes. Five-foot-wide sidewalks and five-foot boulevards will be provided on both sides of North 19th Avenue and Oak Street. Due to financial limitations and the fact that developers of recently annexed properties adjacent to the roadways plan to construct paved access roads, Project M1299(1) is likely to be stage constructed. This alternative was selected because it is necessary to accommodate projected design year traffic; it provides design continuity between other segments of the perimeter arterial system; and it is compatible with interim private construction efforts on North 19th Avenue and Oak Street. The development of North 19th Avenue will affect the Smith farm, a site eligible for inclusion in the National Register of Historic Places. Mitigation of impacts to the site will be accomplished under the terms of a Memorandum of Agreement between FHWA, MDOH, and the State Historic Preservation Office.

A 62-foot-wide two-lane roadway consisting of two 14-foot driving lanes, a 14-foot painted median and two 10-foot emergency parking/bicycle lanes was identified as the preferred alternative for the Kagy Boulevard project. Two eight-foot boulevards and two five-foot sidewalks will be constructed on each side of the roadway. This alternative was selected because it will function effectively in the design year and has design features consistent with the previous improvement project on Kagy Boulevard. Funding limitations may require this project to be stage constructed.

Summary

A. Project Description

This Environmental Impact Statement/Section 4(f) Evaluation contains an examination of two proposed projects which will result in improvements to three arterial streets in the western portion of Bozeman, Montana. Project M1299(1) includes the construction of new traffic facilities on North 19th Avenue (FAU 1201) and Oak Street (FAU 1202). The proposed improvements to North 19th Avenue would extend northward from the intersection of Durston Road to Oak Street, then eastward along Oak Street to its intersection with North Seventh Avenue. The total length of Project M1299(1) is approximately 1.4 miles. Project M1212(4) proposes to improve and/or construct Kagy Boulevard (FAU 1212) from South 19th Avenue to South Third Avenue, a distance of 1.0 miles. Both projects provide for the continued development of an arterial road system on the perimeter of the City of Bozeman. Recent projects on Highland Boulevard (Holly Drive to East Main), Kagy Boulevard (highland to South Third Avenue), and North 19th Avenue (Babcock Street to Durston Road) have completed a significant portion of the perimeter arterial system.

The initiation of these projects was motivated by several factors including:

- Rapid residential and commercial development in outlying areas adjacent to Bozeman;
- Increased traffic on the major road network, particularly on North Seventh Avenue, Main Street, and Durston Road, which has resulted in congestion and excessive delays at several major intersections on the network; and
- The desire to provide linkage between previously completed projects along the perimeter arterial road system.

B. Alternatives Considered

The alternatives selected for evaluation in this document were developed through discussions with representatives of the Federal Highway Administration, the Montana Department of Highways, the City of Bozeman, and Gallatin County. Based on these discussions, several alternatives for both projects evolved. These alternatives included a "no-build" alternative and design layouts similar to those constructed on other portions of North 19th Avenue and Kagy Boulevard adjacent to the project areas. An additional consideration in the development of alternatives was the proposed City of Bozeman design standards for arterial and collector streets. Further discussion of alternatives with the Bozeman Technical Advisory Committee (TAC) identified a design option consisting of construction of two lanes of an ultimate four-lane facility. The two-lane roadway would be offset within the right-of-way to facilitate future

construction of two additional travel lanes when traffic volumes warrant. Since initial traffic volumes may not require four-lane facilities, such alternatives for each project have been presented as two-lane roadways with corresponding four-lane versions.

The alternatives that were developed for the EIS are described in the following narrative. All build alternatives will require the acquisition of additional right-of-way along North 19th Avenue, Oak Street, and Kagy Boulevard. Right-of-way sufficient to accommodate the development of four-lane facilities will be acquired. All build alternatives will include curb and gutter with storm drainage facilities and provisions for bicyclists and pedestrians over the length of the projects. Both North 19th Avenue - Oak Street and Kagy Boulevard are planned as limited access facilities, and an access control plan will be jointly developed by the City of Bozeman and the Department of Highways. No parking along the roadway will be permitted, except in emergency situations, for any of the construction alternatives.

1. North 19th Avenue - Oak Street

Alternative No. 1 "No-Build" Alternative. This alternative would leave the project area in its present undeveloped state.

Alternative No. 2 A 43-foot-wide two-lane street consisting of 12-foot driving lanes in each direction and two nine and one-half-foot shoulders that would accommodate emergency parking and bicycle traffic. This alternative would also include five-foot-wide boulevards and a five-foot-wide sidewalk on each side of the roadway. This alternative is similar to the standard for collector streets proposed by the City of Bozeman.

Alternative No. 3

Two-Lane Version: A 91-foot-wide divided two-lane street consisting of two 17-foot driving lanes, two eight-foot bicycle lanes, two 12-foot emergency parking lanes, a 17-foot median, and a six and one-half-foot boulevard and a five-foot sidewalk on each side of the roadway. This alternative is identical to the portion of North 19th Avenue between Beall Street and Durston Road that was recently constructed.

Four-Lane Version: A 91-foot-wide divided four-lane street consisting of two 14-foot driving lanes, two 12-foot driving lanes, two 11-foot emergency parking/bicycle lanes, a 17-foot median, two six and one-half-foot boulevards, and a five-foot sidewalk on each side of the roadway.

Alternative No. 4

Two-Lane Version: A 66-foot-wide divided two-lane street consisting of two 14-foot driving lanes, two 12-foot

emergency parking/bicycle lanes, a 14-foot median, two 11-foot boulevards, and a five-foot sidewalk on each side of the roadway.

Four-Lane Version: A 78-foot-wide divided four-lane street consisting of two 12-foot driving lanes, two 14-foot driving lanes, a 14-foot median, two six-foot emergency parking/bicycle lanes, and five-foot boulevards and sidewalks on each side of the roadway. This alternative is the arterial street standard proposed by the City of Bozeman.

Alternative No. 5

Two-Lane Version: A 32-foot-wide two-lane street consisting of two 12-foot driving lanes, two four-foot shoulders, a five-foot boulevard, and a five-foot sidewalk on one side of the roadway. The roadway would be offset in the right-of-way to provide two travel lanes and a shoulder for a future four-lane facility. This alternative is similar to the section recently constructed on Highland Boulevard north of Kagy Boulevard.

Four-Lane Version: Two additional travel lanes, a median, boulevards, and sidewalks would be constructed within the right-of-way to provide a section similar to the arterial street standard proposed by the City of Bozeman.

2. Kagy Boulevard

Alternative No. 1 "No-Build" Alternative. This alternative would not require any change to the gravel-surfaced or 24-foot-wide paved roadway that currently exists in the Kagy Boulevard project area. The planned arterial link between Highland Boulevard and South 19th Avenue would remain uncompleted.

Alternative No. 2 A 43-foot-wide two-lane street consisting of 12-foot driving lanes in each direction and two nine and one-half-foot-wide shoulders that would accommodate emergency parking and bicycle traffic. This alternative would also include a five-foot-wide sidewalk on each side of the roadway. This alternative is similar to the standard for collector streets proposed by the City of Bozeman.

Alternative No. 3

Two-Lane Version: A 69-foot-wide divided two-lane street consisting of two 12-foot driving lanes, two eight-foot emergency parking lanes, and a 29-foot median. In addition, the section includes two four-foot boulevards and a five-foot sidewalk and an eight-foot-wide bicycle lane located on opposite sides of the roadway. This section was constructed on Kagy Boulevard between South Third Avenue and Highland Boulevard.

Four-Lane Version: A 69-foot-wide four-lane street consisting of two 13-foot driving lanes, two 12-foot driving lanes, a 19-foot median, and a five-foot sidewalk and an eight-foot bicycle lane located on opposite sides of the roadway. This section received consideration as an alternative for converting Kagy Boulevard east of South Third Avenue from a two-lane to a four-lane facility.

Alternative No. 4

Two-Lane Version: A 62-foot-wide divided two-lane street consisting of two 14-foot driving lanes, two 10-foot emergency parking/bicycle lanes, a 14-foot median, two eight-foot boulevards, and a five-foot sidewalk on each side of the roadway.

Four-Lane Version: A 78-foot-wide divided four-lane street consisting of two 14-foot driving lanes, two 12-foot driving lanes, two six-foot emergency parking/bicycle lanes, a 14-foot median, and five-foot-back-of-curb sidewalks on both sides of the roadway. This section is similar to the arterial street standard proposed by the City of Bozeman but modified to fit in a 90-foot right-of-way by eliminating the five-foot boulevards.

Alternative No. 5

Two-Lane Version: A 32-foot-wide two-lane street consisting of two 12-foot driving lanes, two four-foot shoulders, and a five-foot sidewalk on one side of the roadway. The roadway would be offset in the right-of-way to provide two travel lanes and a shoulder for a future four-lane facility. This alternative is similar to the section recently constructed on Highland Boulevard north of Kagy Boulevard.

Four-Lane Version: Two additional travel lanes, a median, and sidewalks would be constructed within the right-of-way to provide a section similar to the arterial street standard proposed by the City of Bozeman, omitting boulevards to fit within a 90-foot right-of-way.

Based on the traffic capacity analyses conducted for the proposed projects, the minimum facility requirements were determined for each section of roadway evaluated in the EIS. These requirements are summarized below:

- Four 12-foot-wide travel lanes will be necessary to accommodate design year traffic volumes on North 19th Avenue. Minor pavement widening will be required at the North 19th Avenue - Durston Road intersection. The existing portion of North 19th Avenue south of Durston Road must be restriped as a four-lane facility to provide continuity between sections.

- Two 12-foot-wide travel lanes and a median with left turn bays at all intersections are necessary to

accommodate design year traffic on Oak Street between North Seventh and North 19th Avenues. However, a four-lane facility is recommended as the ultimate design for Oak Street since projected traffic volumes could be handled more effectively than with the two-lane alternatives. A four-lane facility would provide passing availability which is desirable considering the truck traffic which may be present on the facility.

- Kagy Boulevard can function effectively in the design year if two 12-foot travel lanes and a median with left turn bays at all intersections are provided. Minor pavement widening will be necessary at the Kagy Boulevard - Willson Avenue intersection to allow for the installation of right turn bays.

C. Preferred Alternatives

The selection of preferred alternatives for North 19th Avenue - Oak Street and Kagy Boulevard is the joint responsibility of local governmental officials (TAC and PCC), the Montana Department of Highways, and the Federal Highway Administration. Based on facility requirements, costs, and environmental impacts identified by the Consultant's EIS evaluations, these agencies selected preferred alternatives for both project areas. The preferred alternatives and the reasons for their selection are discussed in the following text.

1. North 19th Avenue - Oak Street

The Bozeman Policy Coordinating Committee (PCC) at the recommendation of TAC selected the four-lane versions of Alternatives 4 and 5 (identical in design) as the most appropriate facility for North 19th Avenue and Oak Street. The MDOH and FHWA concurred in this recommendation. The design of the preferred alternative was modified slightly so four 12-foot-wide driving lanes and two eight-foot shoulders will be provided. This design modification can be accomplished by simply restriping the typical roadway section proposed in Alternative 4/5. The total cost of the proposed action is approximately $3,219,000 which includes $367,900 for right-of-way acquisition and utility relocations and $2,851,000 for construction of the roadway. It should be noted that construction costs are presented in 1984 dollars. The proposed facility was selected as the preferred alternative for the following reasons:

- The projected design year traffic volumes on North 19th Avenue indicate that a four-lane will be required. Although projected traffic volumes on Oak Street may be accommodated by a two-lane roadway, multiple approach lanes will be required at all major intersections. The transitions from narrow two-lane alternatives to the wider intersection approaches and the multi-lane approaches themselves would consume more than half the length of the Oak

Street segment. Therefore, the four-lane design was also selected for Oak Street.

- The preferred alternative is only slightly more expensive (approximately 13%) than the least cost two-lane alternative; however, the facility will provide greater flexibility than the two-lane alternatives in accommodating the demands of future traffic.

- The provision of eight-foot-wide shoulders and 12-foot-wide travel lanes are consistent with AASHTO standards for arterial streets.

- The right-of-way required for the preferred alternative (100-foot-wide) will minimize the acquisition of right-of-way along the corridors and will avoid the taking of the Smith farmhouse, a property eligible for inclusion in the National Register of Historic Places.

- Developers of recently annexed properties adjacent to North 19th Avenue and Oak Street have donated right-of-way and must construct paved access roads to these parcels prior to obtaining local government approval for additional site development. One developer plans to construct an access road within the Oak Street right-of-way corridor during the summer of 1986. Similar construction is likely in the near future on North 19th Avenue. The placement within the right-of-way and the proposed road design is compatible with the development of the preferred alternative and will result in a reduction of overall project costs.

2. Kagy Boulevard

The Bozeman PCC, at the recommendation of TAC, identified the two-lane version of Alternative 4 as the preferred alternative for Kagy Boulevard. The preferred alternative will be constructed from South 19th Avenue to near Greek Way where it will match a previous improvement project on Kagy Boulevard. The design of this alternative was modified somewhat to provide a 14-foot-wide painted median rather than a raised median. The total cost of this alternative is estimated to be approximately $1,489,000, which includes $167,000 for right-of-way acquisition and relocation of utilities and $1,322,000 for facility construction (1984 dollars). This alternative was selected for the following reasons:

- Projections of future traffic volumes on Kagy Boulevard indicate that a two-lane facility with separate left-turn lanes at the intersections will be sufficient to handle traffic needs in the design year. The preferred alternative will provide adequate travel lanes and shoulders and will allow left-turn bays to be installed in the painted median.

- Alternative 4 will maintain a design continuity between the portions of the perimeter arterial road system that have already been constructed. The design features of the preferred alternative are similar to those utilized in previous Kagy Boulevard projects.

- The preferred alternative includes design features that will facilitate pedestrian and bicyclist traffic along Kagy Boulevard. The provision of sidewalks where none currently exist is particularly desirable along the southern portion of the MSU campus and near Reno H. Sales Stadium. The wide shoulder area of the preferred alternative will provide a continuous facility for bicycle traffic over the length of Kagy Boulevard. The Bozeman Bicycle Route plan identifies Kagy Boulevard as a probable location for a bikeway.

Detailed descriptions of each preferred alternative are contained in Part II, Alternatives, Including the Proposed Actions.

D. Significant Environmental Impacts

The significant impacts of the proposed projects are summarized as follows:

- The proposed roadways will be able to accommodate projected traffic volumes at a reasonable level of service.

- Right-of-way must be acquired along both project corridors. The projects will result in one business relocation and one residential relocation.

- The provision of a roadway in the North 19th Avenue - Oak Street area and resulting access improvements may further stimulate growth in this portion of northwest Bozeman.

- The proposed projects will provide substantial traffic relief to North Seventh Avenue, West Main Street, Durston Road, and several minor streets in each project area. Completion of the perimeter arterial system will result in significant traffic increases over the length of North 19th Avenue and Kagy Boulevard.

- The design year traffic volumes on North 19th Avenue and Kagy Boulevard may produce noise levels that approach or exceed FHWA noise abatement criteria in several residential areas along the arterial road system.

- The proposed construction of North 19th Avenue will require that right-of-way be acquired from the Smith

farm, a property determined to be eligible for inclusion in the National Register of Historic Places.

- Substantial utility relocation will be required along the North 19th Avenue and Oak Street alignments. These relocations must be completed prior to construction.

- The Farmer's Canal must be relocated in a piped conduit along North 19th Avenue and Oak Street and will be used to handle a share of the storm drainage along a portion of this corridor. Stormwater will be routed through proposed detention facilities along this corridor and through existing natural drainages along Kagy Boulevard.

E. Significant Issues and Areas of Controversy

The issues and areas of controversy addressed in this EIS were identified at the scoping meetings held during the initial phases of the project. These issues are summarized below:

Significant Issues		
North 19th - Oak	**Kagy Boulevard**	**Bozeman Arterials**
• N. 19th Extension to Baxter & I-90 • Traffic Volumes and Capacities • Provision for Truck Traffic • Impacts to Farmers Canal • Farmland Conversion • Right-of-Way Acquisition • Storm Drainage and Utilities • Noise Impacts • 4(f) Impacts to Smith Farm • Impacts to Possible Trout Habitat	• Right-of-Way Acquisition • Pedestrian/Bicyclist Provisions • Storm Drainage Facilities • Effects on MSU Facilities • Noise Impacts • Access Limitations • Impacts to Potential Trout Habitat • Cultural Resource Inventory • 4(f) Applicability to MSU	• Secondary Development • Consistency with Local Planning • Project Time Schedules

F. Issues to be Resolved

The primary issue to be resolved is the project funding. The City of Bozeman's annual Federal Aid Urban funding (approximately $300,000 per year) is not sufficient to be the sole funding source for these construction projects. The projects will have to be postponed for several years until adequate FAU funds are accrued unless alternate local funding sources can be obtained to supplement federal funding. Assuming that FAU funds will comprise the sole source of funding for the projects and that Bozeman's annual share of these funds will remain constant at current levels, sufficient funding to construct North 19th Avenue - Oak Street will not be accrued for approximately 11 years. The completion of Kagy Boulevard will require the commitment of an additional five years of FAU funding to underwrite project costs. Right-of-way acquisition for both project corridors is scheduled to occur during FY 1987 and FY 1988 of Bozeman's FAU funding program.

G. Actions Required by Other Agencies

The State Historic Preservation Office (SHPO) was consulted by MDOH to identify the effects of the proposed North 19th Avenue improvement project on the Smith farm historic property and to determine if the conclusions and mitigation efforts proposed by MDOH satisfied the requirements of Section 106 of the Historic Preservation Act. The findings of the EIS were also reviewed by the Department of the Interior (Parks Department) for Section 4(f) compliance and by the Advisory Council on Historic Preservation for Section 106 compliance. A Memorandum of Agreement (MOA) outlining the required mitigation efforts was ratified by the Chairman of the Advisory Council on July 25, 1986 and was signed by FHWA, MDOH, and SHPO representatives. This action completed the Section 106 process.

Prior to construction of the North 19th Avenue - Oak Street and Kagy Boulevard projects, approval of drainage provisions will be requested from the Montana Department of Fish, Wildlife, and Parks. Additionally, the design plans for the proposed stream crossings will be transmitted to the U.S. Army Corps of Engineers for their review and project files as recommended in the Department's comments on the draft Environmental Impact Statement.[1]

[1] Richard D. Gorton, Chief, Environmental Analysis Branch, Planning Division, U.S. Dept. of the Army. Corps of Engineers in a personal communication March 21, 1986.

H. Other Significant Government Actions

The Montana Department of Highways intends to further develop FAS Route 235, East Valley Center Drive, from Jackrabbit Lane south of Belgrade to an intersection with Baxter Lane at North 19th Avenue. Currently, no firm letting date has been established for the project. This project is likely to increase traffic volumes on the North 19th Avenue corridor. Serious traffic impacts are likely to occur in the future if the East Valley Center Drive project is constructed prior to the installation of traffic facilities on North 19th Avenue. Traffic on East Valley Center Drive would be required to enter Bozeman's street network via Baxter Lane at North Seventh Avenue. This intersection is already considered unsafe, and additional traffic volumes would compound the hazards at this location and increase congestion on North Seventh Avenue.

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Introduction

The Montana Department of Highways (MDOH) proposes to construct or improve portions of three arterial streets in Bozeman, Montana. The proposed development consists of two separate projects identified as: M1299(1), including North 19th Avenue from Durston Road northward to Oak Street and Oak Street from North 19th Avenue eastward to North Seventh Avenue; and M1212(4), including the western section of Kagy Boulevard from South Third Avenue to South 19th Avenue. Prior to the construction of these projects, an environmental impact statement (EIS) must be prepared to determine if the proposed actions will significantly affect the local environment. The EIS will also consider the impacts resulting from construction of North 19th Avenue between Oak Street and Baxter Lane; however, this roadway segment will not be included in the construction of Project M1299(1). The Federal Highway Administration (FHWA) and the Montana Department of Highways are the lead agencies for the project.

A. The EIS

The Federal Highway Administration and the Montana Department of Highways determined that an EIS must be prepared for the proposed arterial development in Bozeman due to the expense of Federal Aid Urban funds required and potential for environmental concerns in the project areas. Therefore, prior to the construction of the proposed projects, FHWA is required to prepare an EIS and a record of decision (ROD) by the National Environmental Policy Act (NEPA). The Department of Highways is participating in the preparation of the EIS as a joint lead agency under the provisions outlined in 23 CFR 771.109(c)(2). The EIS will be adopted by MDOH as a contemporaneously prepared document on the proposed actions in Bozeman as authorized under 18-2.2(2)-P260, ARM.

As required by NEPA, the agencies must follow a detailed procedure including:

- an extensive public involvement process;
- issuance of a draft EIS and a subsequent public hearing;
- a review and comment period on the draft by involved federal, state and local agencies, and the public;
- issuance of a final EIS containing corrections or clarification of subject matter in the draft and responses to substantive agency and public comments;
- a 30-day review period prior to the preparation of the record of decision (ROD) by FHWA for the proposals.

The EIS analyzes the alternatives selected for evaluation, the existing conditions in the project areas that will be affected, and the impacts of the proposed actions on local environment. The preparation of the EIS is a safeguard to ensure that the proposed actions are well planned; that the environmental impacts which may occur are identified and mitigated; and that the concerns of all agencies, organizations, and individuals are considered prior to project implementation.

B. Scope of Analysis

Based upon a review of project files, meetings with involved agencies, and a series of public meetings, a number of issues and concerns were identified. The following concerns are evaluated in the EIS.

- What roadway alternatives will be considered for projects M1299(1) and 1212(4)? Which alternative will be selected as the "preferred alternative" and ultimately built? When will the projects be constructed? What will the construction costs for each of the alternatives be?

- What would the impacts be to the road and street system in Bozeman as a result of these projects? Where would traffic impacts be likely to occur? What type of traffic and how much traffic can be expected on each of these arterials initially and in the design year? What traffic benefits will be provided by construction or improvement of these urban routes? Are these projects consistent with local, state, and federal planning efforts?

- What effects will the construction of these projects have upon the immediate project areas? Will secondary development be stimulated by completion of a substantial portion of an arterial "loop" around the City? Will the projects result in significant noise impacts and decreases in local air quality? Is the loss of farmland in each project area a significant impact? How much right-of-way will be required for each project?

- What provisions will be included in the design to ensure that traffic flows smoothly and delays will be minimized at the major intersections at the termini of each project? Will pedestrians and bicyclists be accommodated by the alternatives? Will access be restricted along the roadway? Will on-street parking be permitted?

- What impacts will the proposed actions have on the surface and groundwater resources in the project areas? How will impacts to the Farmer's Canal along North 19th Avenue be mitigated? What storm drainage provisions will be incorporated into each project?

- What socio-economic impacts will result if the proposals are constructed? Will any particular socio-ethnic group be affected by the projects? Will residential or commercial relocations be required? If so, what mitigation will be provided?

- How will the proposed actions affect vegetation, fish, and wildlife in the study areas?

- Will historic, cultural, or recreational resources be affected by the proposed actions?

In addressing these concerns, the EIS will analyze existing conditions in Part III, Affected Environment, and identify impacts in Part IV, Environmental Consequences. Measures to mitigate the identified impacts are also presented in this document.

C. Research and Documentation

Data used for the EIS analysis is drawn from a number of sources, containing the most current information available. In cases where required information is non-existent or not project specific, field data was collected. The field investigations performed for this EIS included: machine counts of traffic at various locations on the city street system; cultural resource inventories for both project areas; vegetation, fish and wildlife studies for each project study area; and a land use inventory for the socio-economic analysis. Much of this document's coverage of the physical and socio-economic conditions in the Bozeman area was developed from existing reports. These sources are footnoted in the text of the EIS and included in a general reference list in Appendix C.

Mathematical formulas and computer modeling techniques which are widely used to assess impacts are also employed in the EIS. Such procedures are commonly used to identify air quality, noise, traffic, and water quality impacts. Where appropriate, these techniques have been identified and referenced in the EIS.

D. Participants and Responsibilities

A number of agencies, groups, and individuals have participated in the writing or review of the EIS; and several will be responsible for regulating activities associated with the implementation of each project. The following text identifies the major participants and briefly describes the responsibilities as they relate to this EIS.

Federal and State Agencies

Federal Highway Administration: The Federal Highway Administration (FHWA) is the federal lead agency for the Bozeman Arterials EIS and must ensure that this document meets the provisions of NEPA. The FHWA provided technical

guidance during the preparation of this document and reviewed the text for content and conformance to agency policies. The FHWA also administers funding for the Federal Aid road system.

Montana Department of Highways: The Montana Department of Highways (MDOH) is the state lead agency for the preparation of the EIS. MDOH provided technical assistance, background information, legal review, and numerous supplemental studies used in the drafting of this document. MDOH administers Montana's allocation of Federal Aid Urban funding. The agency was also responsible for selection of the Consultant and administration of the contract detailing the required work items.

Environmental Protection Agency (EPA): The Montana Office of EPA functioned as a regulatory agency and provided a review of this document with respect to the Federal Clean Air Act and the Federal Water Pollution Control Act.

U.S. Department of Agriculture, Soil Conservation Service: This agency was consulted to determine if prime and unique agricultural lands were present in the study area. SCS also provided guidance to ensure the provisions of the Farmland Policy Protection Act were satisfied and assisted the Consultant in determining the impacts of farmland conversion in the project areas.

U.S. Department of the Interior, Fish and Wildlife Service: The Fish and Wildlife Service was consulted in accordance with Section 7(c) of the Endangered Species Act, as amended. This consultation was undertaken to determine if any federally-listed threatened or endangered species are likely to occur within the areas affected by the proposed projects.

Montana Department of Health and Environmental Sciences (MDHES): This agency serves as the State's regulatory and enforcement agency for air and water quality matters. The MDHES Air Quality and Water Quality Bureaus provide a review of the documents to ensure that the projects are consistent with the Montana and Federal Clean Air Acts and Montana Water Quality Standards.

Montana Historical Society, State Historic Preservation Office (SHPO): The State Historic Preservation Office has the responsibility to cooperate with and advise MDOH when potential historical, archaeological, or cultural resources may be affected by the proposed action. If the cultural resource survey discovers a potentially valuable property, SHPO will be consulted and will seek a determination from the Keeper of the National Register as to whether or not the site is eligible for inclusion in the National Register of Historic Places. SHPO also reviews the EIS to ensure compliance with federal regulations concerning protection of such resources. If cultural resources are adversely affected, SHPO will provide guidance for mitigation of impacts.

Local Agencies

City of Bozeman and Gallatin County: Numerous city and county agencies were consulted during the preparation of the EIS to obtain information concerning rights-of-way, land ownerships, local planning and zoning, engineering standards, utility locations, and other supplemental information. The EIS is also reviewed by representatives of local government to help assure that the analyses and recommendations are consistent with city and county policies.

Bozeman Policy Coordinating Committee (PCC): PCC is made up of the chief executives of both the city and county, the director of the city-county planning board, and administrators from the MDOH. The committee is responsible for the final local approval of system revisions. PCC approved the North 19th Avenue - Oak Street and Kagy Boulevard projects and determined the local order of priorities for projects funded through the Federal Aid Urban system.

Bozeman Technical Advisory Committee (TAC): TAC is composed of technical persons from the city and county governments and the Montana Department of Highways. In addition, several citizen representatives are members of the committee. The purpose of TAC is to provide technical advice to PCC and direction to local transportation planning efforts. TAC was consulted a number of times during the preparation of the EIS to obtain input regarding the project scope, development of alternatives, and design features. Members of TAC will review the EIS for content and conformance to local transportation goals.

The Public

Public Participation: The NEPA process is intended to ensure that environmental information is available to public officials and citizens before decisions are made. It is FHWA and MDOH policy that decisions shall be made in the best overall public interest and that agencies and the public be involved early enough to influence technical studies and final decisions. Numerous opportunities for public comment, both oral and written, were available during preparation of the EIS. A formal public hearing on the draft EIS will be held and responses to all substantive public comments received on the draft EIS will be included in the final document.

The Consultant

Robert Peccia and Associates (RPA): Robert Peccia and Associates of Helena, Montana, was retained by MDOH to prepare the EIS for of North 19th Avenue - Oak Street and

Kagy Boulevard. It is the responsibility of the Consultant to perform research, conduct technical studies, hold public meetings during the preparation of the EIS, and to prepare and print the EIS. RPA employed additional subcontractors, as needed, to provide technical expertise.

E. Project Funding and Priorities

The primary funding source for the construction of projects M1299(1) and M1212(4) is the Federal Aid Urban System Program. This funding source is derived entirely from federal highway-user taxes and fees. State funds needed to match federal funding are derived from state highway-user taxes and fees such as motor vehicle fuel taxes, gross vehicle weight taxes, and motor vehicle registration fees. State matching funds under the Urban System Program are distributed to urban cities of over 5,000 population based on the ratio of each city's urban population to the total urban population in all Montana cities with more than 5,000 people. The Montana Department of Highways typically pays for all costs on federal-aid projects and then bills the Federal Highway Administration for the federal share of the project costs. Currently this fund is accumulating at approximately $299,000 per year for the Bozeman urban area.[1] Federal Aid Urban funds are the funding source for the preparation of the Bozeman Arterials EIS and may be the only funds that will be used to construct Projects M1299(1) and M1212(4).

The Bozeman Transportation Plan, adopted by PCC in October, 1982 at the recommendation of the Technical Advisory Committee, identifies 11 projects within the Bozeman urban area that are committed to be constructed or are in the planning stages. Each project was assigned a priority for implementation and a tentative order of implementation was established. With the recent completion of high priority improvement projects on 19th Avenue and Kagy Boulevard, other urban system projects, specifically projects M1299(1) and M1212(4), have become the number one and two priority projects in the urban area. The extension of North 19th Avenue to Baxter Lane and ultimately to an interchange at I-90 was identified in the plan as a recommended long-range improvement for the Bozeman transportation system.[2] The Bozeman PCC, on behalf of the City of Bozeman and Gallatin County, recently submitted a nomination to MDOH for construction of an additional I-90 interchange in the North 19th Avenue - Springhill Road area.[3] PCC has also indicated its support for the City of Bozeman's attempt to acquire rights-of-way and construct an interim roadway on Kagy Boulevard between South 11th and South 19th Avenues. The City hopes to undertake the project as soon as possible and in a manner that is consistent with the improvement plans for Kagy Boulevard.

[1] Michael S. Davis, Supervisor Urban Planning Section, MODH, in a personal communication June 12, 1985.

[2] Bozeman Transportation Plan, Clete Daily and Associates, Helena, January 1982, p. 48.

[3] "Nomination for Construction of an Additional I-90 Interchange at North 19th Avenue - Springhill Road West of Bozeman", by Bozeman PCC, July 1, 1985.

Part I: Purpose and Need

A. Description of Projects

North 19th Avenue - Oak Street and Kagy Boulevard are located on the northwest and south sides of Bozeman, respectively. These projects are part of an arterial street system being developed around the periphery of the city which includes: Highland Boulevard, from East Main Street to Kagy Boulevard; Kagy Boulevard; 19th Avenue; and Oak Street, from North 19th Avenue to North Seventh Avenue. An additional arterial corridor is being considered which would link North Seventh Avenue with Rouse Avenue via Oak Street or Tamarack Street. Project M1299(1) includes a proposal to construct a new roadway for 0.5 miles of North 19th Avenue, from Durston Road to Oak Street, and for 0.8 miles of Oak Street, from North 19th Avenue to North Seventh Avenue. Project M1212(4) proposes to construct or improve approximately 1.0 mile of Kagy Boulevard, South Third Avenue to South 19th Avenue. The location of each project is shown in Figure 1.

The boundaries for the projects were determined from local, state, and federal planning efforts, past construction projects, and the availability of funding. The termini for project M1299(1) were determined to be Durston Road at the south end of the project and North Seventh Avenue at the east end of the Oak Street segment. Durston Road was the northern terminus for an extensive reconstruction project on North 19th Avenue that was completed in 1982. North Seventh Avenue is a major north-south arterial which provides access to the City of Bozeman from I-90 and U.S. 10. Since no firm route location or committed improvement projects exist for the continuation of an arterial corridor eastward to Rouse Avenue, North Seventh Avenue was determined to be a logical terminus for the proposed project. The boundaries for the proposed improvements of Kagy Boulevard were determined to be South Third Avenue and South 19th Avenue. South Third Avenue is the western terminus of a recently completed reconstruction project on Kagy Boulevard. South 19th Avenue is an arterial on the southwest edge of Bozeman that has been previously upgraded to a 30-foot-wide roadway.

Each of the arterials identified for evaluation in this EIS are elements of the Bozeman Federal Aid Urban System. North 19th Avenue and Oak Street have been designated as FAU 1201 and FAU 1202, respectively. North 19th Avenue was placed on the Federal Aid Urban System in 1974, and Oak Street from Seventh Avenue to 19th Avenue was placed on the system in 1976. Kagy Boulevard was placed on the Federal Aid Urban System in 1974 and was designated as FAU 1212. The section of Kagy Boulevard between South 3rd Street and South 11th was previously improved to a 24-foot-wide curbed roadway with a 90-foot-wide right-of-way corridor.

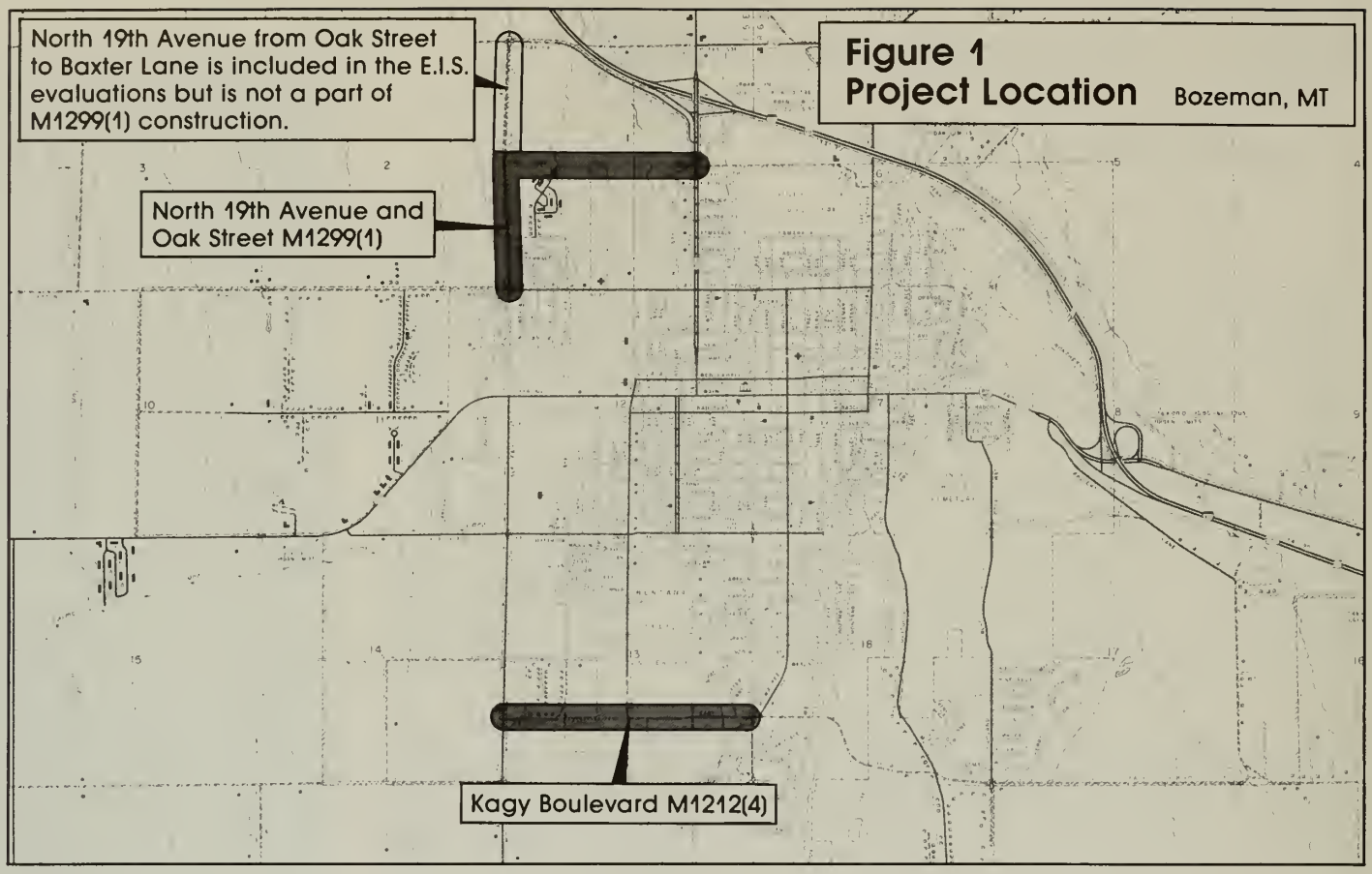

North 19th Avenue from Oak Street to Baxter Lane is included in the E.I.S. evaluations but is not a part of M1299(1) construction.
North 19th Avenue and Oak Street M1299(1)
Kagy Boulevard M1212(4)

Figure 1
Project Location Bozeman, MT

Additionally, a portion of North 19th Avenue extending from Oak Street northward to Baxter Lane will be evaluated in this EIS. Although this section of roadway will not be included as part of project M1299(1) construction, the Federal Highway Administration, the Montana Department of Highways, and the Bozeman TAC determined that the environmental impacts of completing North 19th Avenue should be evaluated.[1] This decision was influenced by the numerous public comments received during the scoping process and by MDOH intentions to develop East Valley Center Drive from Jackrabbit Lane, south of Belgrade, to its intersection with Baxter Lane approximately one-half mile north of Oak Street. The Bozeman Policy Coordinating Committee, at the recommendation of TAC, also identified a location at North 19th Avenue - Springhill Road as a desirable location to construct a future I-90 interchange. Since there are numerous development proposals for properties in North 19th - Oak Street area, it is prudent to consider this route in the Bozeman Arterials EIS.

[1] Formal motion, Bozeman TAC at its April 4, 1985 meeting.

The primary objectives of these street improvement projects are to:

- Implement the recommendations of the Bozeman Transportation Plan through the further development of an arterial street system around the City of Bozeman.

- Provide serviceable arterial routes with design features that will easily accommodate future expansion in developing areas of Bozeman.

- Provide facilities for pedestrians and bicyclists where none exist at present.

- Relieve congestion and reduce delays at major intersections on North Seventh, West Main, 19th Avenue, and Durston Road.

B. History of Projects

Although transportation planning in the Bozeman area has recognized the need for roadway improvements on 19th Avenue, Oak Street and Kagy Boulevard since the late 1950's, Projects M1299(1) and M1212(4) have relatively brief project histories. These projects were identified as committed improvements in the Bozeman Transportation Plan. Authorizations to proceed with preliminary engineering for improvements to Kagy Boulevard and North 19th Avenue - Oak Street were granted in 1978 and 1983, respectively.[2]

[2] Davis, pers. comm. June 12, 1985.

The proposed projects are part of the continuing development of a "loop" system of arterials consisting of Highland Boulevard, Kagy Boulevard, 19th Avenue and Oak Street which will allow traffic movement around rather than through the City of Bozeman. This concept was initially proposed in the "Arterial Streets Plan" prepared in 1958 and subsequently updated in 1967.[3] Several recent construction projects in the Bozeman urban area have been completed or initiated for the purpose of completing this perimeter arterial system. These projects include: Highland Boulevard, East Main to Holly Drive (1985); Kagy Boulevard, Highland Boulevard to South Third (1984); and North 19th Avenue, Babcock to Durston Road (1983). These projects were implemented in response to continued residential and

[3] Planning Studies, Bozeman Montana Planning Area - Summary Report, Consulting Services Corp. and Theodore J. Wirth & Assoc., September 1967.

Photo 1
North 19th Avenue between Durston Road and Babcock Street was reconstructed to a divided two-lane roadway in 1983. This view from Durston Road depicts the typical features of the roadway and the adjacent residential development.

commercial development in and adjacent to the City of Bozeman. The proposed projects offer improvements which will help relieve congestion within the city and facilitate movement between I-90, U.S. 191 (FAP 50), Montana State University, and residential areas in the Gallatin Valley.

Photo 2
Typical section of Kagy Boulevard east of South Third Avenue. This project was completed in 1984. Note the installation of an eight-foot wide bicycle path at right.

The development of arterials in Bozeman, particularly North 19th Avenue - Oak Street and Kagy Boulevard was identified in previous transportation planning efforts. The Arterial Streets Plan developed by Wirth & Associates identified North 19th Avenue, Oak Street and Kagy Boulevard as major arterials. North 19th Avenue from Oak Street to Baxter Lane was designated as a collector street. The "circumferential route" of primary arterials was one of the primary concepts of the plan. The Bozeman Transportation Plan, adopted by the Bozeman Policy Coordinating Committee in October, 1982 at the recommendation of Bozeman TAC, classified North 19th Avenue - Oak Street and Kagy Boulevard as minor arterials and identified projects M1299(1) and M1212(4) as priorities number three and number five, respectively, among their committed improvement projects. With the completion of other urban projects in Bozeman, these projects have since become the number one and two priorities for Federal Aid Urban funded projects. The Bozeman Area Master Plan, adopted by local governing bodies in 1983, incorporated elements of the transportation plan including road and street system priorities. Since the completion of the Bozeman Transportation Plan, a supplement to the plan was prepared in September, 1983 which identified funding sources and possible funding scenarios for committed improvement projects.

C. Purpose and Need

Gallatin County and the City of Bozeman have both experienced significant growth in recent years. The county-wide population increased by nearly 32% from 1970 to 1980; however, the area surrounding Bozeman grew by more than 60% over the same period. The City of Bozeman grew by approximately 16% during the

1970's indicating a trend toward suburban growth. Population projections for Bozeman anticipate that the city will grow at a rate higher than the previous decade due to the large amount of residential lands that have been annexed in recent years. The optimistic economic future of the Bozeman area also provides support for projections of growth. Much of the optimism stems from the fact that Bozeman has a stable economic base of agriculture, manufacturing, tourism, retail trade, and Montana State University and offers amenities that are attractive to additional retail and high-tech industries.

Traffic volumes on Bozeman's road and street system have increased significantly in response to community growth during the past ten years. Population and economic projections suggest that community growth will continue at a steady rate in the foreseeable future. Traffic modeling for Bozeman, which utilizes these socio-economic parameters as primary inputs for projecting future traffic volumes, indicates that design year traffic (year 2008) on North Seventh Avenue and West Main Street will be approaching 50,000 vehicles per day. The provision of traffic facilities on North 19th Avenue and Oak Street will reduce design year traffic on North Seventh Avenue and West Main Street by more than 10,000 vehicles per day. The completion of Kagy Boulevard will provide traffic relief of between 6,000 and 9,000 vehicles per day in the design year on Lincoln Road and South 11th Avenue, which currently serve as major access routes to Montana State University.

Nearly half the people working in Bozeman reside outside the city limits, and the agricultural usage of lands surrounding the city has been severely impacted by the continued subdivision and development of these adjacent lands. Development proposals to the west and north of the North 19th Avenue - Oak Street project area will undoubtedly have a significant effect on this portion of Bozeman in the near future. Annexation of 243 acres directly west of North 19th Avenue and the recent commercial/industrial development north of Baxter Lane are examples of the changing land uses in the project area. The Bozeman Area Master Plan has designated the areas adjacent to North 19th Avenue and Oak Street as suitable for medium density residential development with light industrial uses restricted to the area north of Baxter Lane. The Master Plan also recognizes that residential development (low-medium density) and neighborhood commercial uses are suited to the lands adjacent to Kagy Boulevard. Construction of the University Square Apartments and the Campus Square Theaters on South 11th Avenue in recent years is indicative of future development in this area. The Montana State University Master Plan for Campus Development recommended that Kagy Boulevard be improved as part of a perimeter circulation network aimed at creating a pedestrian-centered campus.[4] This development concept will eliminate many pedestrian-vehicle conflicts and will increase the potential for public access to university facilities.

[4] MSU Master Plan for Campus Development, Office of Facilities Planning, March 31, 1982, p. 25.

The development of these arterial streets in Bozeman will have little effect on alternate modes of transportation. The nearest airport, Gallatin Field, is located nine miles west of Bozeman in Belgrade. No rail passenger service or mass transit

service (intra-city bus service) is available in Bozeman. The construction of North 19th Avenue and Oak Street will provide an alternative route for truck traffic heading south via I-90 and U.S. 191 through the Gallatin Canyon. This route will not require such vehicles to travel through the central portion of the city and will alleviate the need to execute difficult right turns at intersections with Main Street.

The proposed projects will provide pedestrian/bicyclist facilities on or adjacent to the roadway. The provision of these design features is especially important to the proposed Kagy Boulevard improvement project due to its proximity to Montana State University and the pedestrian/bicycle traffic generated by campus activities. Since North 19th Avenue, Oak Street, and Kagy Boulevard have been designated as arterial streets, access along the roadways will be limited and on-street parking will be prohibited except for emergency situations.

The development of the North 19th Avenue - Oak Street segment of Bozeman's arterial "loop" will lessen the current traffic congestion commonly experienced at North Seventh Avenue and Durston Road by providing an alternate route around the intersection. The extension of North 19th Avenue to Baxter Lane and ultimately to an I-90 interchange should lessen traffic impacts at this intersection even further. Traffic flows should be improved and delays should be decreased system-wide through the development of intersections with sufficient capacities at North 19th Avenue and Durston Road, Oak Street and North Seventh Avenue, and South 19th Avenue and Kagy Boulevard.

D. Identification of Significant Issues

1. Scoping Meetings

In accordance with the public involvement provisions outlined in the National Environmental Policy Act (NEPA), scoping meetings were held on February 20, 1985, at the Gallatin County Courthouse in Bozeman, Montana, specifically to identify significant issues or concerns that relate to the proposed improvements projects.

The afternoon workshop session, which was held in the Tax Appeal Board Room of the Courthouse from 2:00 to 5:00 p.m., provided an opportunity for interested parties to discuss the projects on an informal basis with representatives of the Montana Department of Highways, the Federal Highway Administration, and the Consultant. Approximately 40 people attended the three-hour workshop session. A substantial portion of those attending the session were students from two Montana State University Civil Engineering classes. The Consultant made a brief presentation describing the proposed projects and highlighting issues and concerns that may be significant during the preparation of the EIS. A number of questions regarding the proposals and EIS procedures were posed by the students and answered by the Consultant. In addition, several

landowners or their representatives attended the workshop and outlined development plans that may affect the project areas.

The evening meeting commenced at 7:00 p.m. and was held in the Community Room of the Courthouse. The meeting lasted one and one-half hours and was attended by approximately 50 people. The Consultant made a formal presentation which detailed the purpose of the scoping process, the major work items and the time schedule, and the initial issues and concerns that may be significant to the EIS. After the presentation, oral comments regarding significant project issues were received from the audience. Forms were also provided at the meeting to enable those in attendance to submit written comments. Four written comments regarding project issues or concerns were received by March 1, 1985.

The scoping meetings were advertised on four Bozeman radio stations (KBOZ, KGLT, KBMN, and KXXL) and in the local newspaper, the Bozeman Chronicle. The radio advertisements were announced at least one time per day during the five days preceding the meetings and four times the day of the meetings by each station. The newspaper advertisement consisted of a bordered announcement published on the two Sundays preceding the meetings and again on the day prior to the meetings. The Montana Department of Highways also sent a notice of the meeting to interested agencies.

2. Review of Project History

The Montana Department of Highways has maintained specific files on the Kagy Boulevard (South Third Avenue to South 19th Avenue) and the North 19th Avenue and Oak Street projects since the late 1970's. These files were reviewed to determine the evolution of each project and to determine agency concerns that were identified through the distribution of a "Notice of Intent" in early 1984. The primary contents of these files were: 1) letters and reports prepared by the Montana Department of Highways; 2) minutes from meetings of the Bozeman Technical Advisory Committee and the Bozeman Policy Coordinating Committee; and 3) letters from people or agencies that would be affected by or have jurisdiction on the projects. All comments and agency concerns in the project files were noted and used to supplement the comments received during the public scoping meetings held February 20, 1985.

Prior to the February scoping meetings, agency representatives and the Consultant met to discuss the projects. The issues and concerns that would most likely be important to the Kagy Boulevard and North 19th Avenue - Oak Street projects were discussed to identify potential problems or specific study needs. In addition, the Consultant met with the Bozeman TAC to outline the project scope and time schedule and to obtain local input regarding significant project issues. These agency discussions allowed a preliminary list of significant issues to be identified and used to stimulate comments at the scoping meetings.

3. Identification of Significant Issues

The scoping meetings and the review of project files identified a number of issues of concern to local officials and residents of the Kagy Boulevard and North 19th - Oak Street areas. Issues that were identified through the scoping process were reviewed by the Consultant and categorized into specific topics that can be logically addressed in the EIS. It should be noted that the selection of significant issues involves judgment on the part of the reviewer and that the selection and ranking of issues is the opinion of the Consultant.

The following table summarizes the significant issues that were identified as a result of the scoping procedures. These issues have been grouped by the Consultant according to their significance to each of the proposed projects.

Table No. 1

Identification of Significant Issues

Relevant Issues	Major Significant Issues	Moderately Significant Issues	Minor Significant Issues
Kagy Boulevard:			
1. Extent of Right-of-Way Acquisition	●		
2. Pedestrian/Bicyclist Facilities and Safety	●		
3. Storm Drainage Provisions	●		
4. Effects on MSU Facilities and Campus Areas	●		
5. Access Limitations		●	
6. Noise Impacts		●	
7. Impacts to Possible Trout Habitat		●	
8. Application of Section 4(f) to MSU Properties			●
9. Cultural Resource Investigations			●
North 19th Avenue and Oak Street			
1. Extension of North 19th Avenue to Baxter Lane and I-90	●		
2. Traffic Volumes and Intersection Traffic Capacities	●		
3. Provisions for Truck Traffic	●		
4. Irrigation System Impacts		●	
5. Farmland Conversion		●	
6. Extent of Right-of-Way Acquisition		●	
7. Storm Drainage Provisions and Utility Locations		●	
8. Noise Impacts		●	
9. 4(f) Impacts to Smith Farm Property		●	
10. Impacts to Possible Trout Habitat			●
Bozeman Arterials			
1. Secondary Development Due to Completing Arterial Links	●		
2. Consistency with Bozeman Area Planning		●	
3. Time Schedule for Project			●

Part II: Alternatives

A. Meetings on Alternatives

In addition to the scoping meeting held in February, 1985, an afternoon workshop and an evening meeting specifically oriented towards discussion of roadway alternatives were conducted on April 10, 1985. These public meetings were utilized to discuss the results of the previous scoping meetings and to obtain comments on the proposed alternatives selected for evaluation in the EIS. Notice of the meetings was advertised in the local newspaper (The Bozeman Chronicle) and on four Bozeman radio stations (KBMN, KBOZ, KGLT, and KXXL) during the week preceding the meetings. A tape recording of the proceedings at the evening meeting is on file with the Montana Department of Highways in Helena. Oral and written comments on the selected roadway alternatives were solicited at this time. Seven people attended the workshop session and 24 people attended the evening meeting.

B. Alternatives Selected for Evaluation

The alternatives selected for evaluation in this document were developed through discussion with representatives of the Federal Highway Administration, the Montana Department of Highways, City of Bozeman, and Gallatin County. Based on the input obtained from these agencies and through the scoping process, several initial alternatives for each project area became obvious. These alternatives include a "no-build" alternative, which must be analyzed by law, and continuations of the road sections adjacent to the project areas on North 19th Avenue and Kagy Boulevard. An additional consideration for the development of alternatives was the proposed City of Bozeman design standards for arterial and collector streets. These standards identify the right-of-way widths and design features that the City of Bozeman hopes to implement within its urban area. Discussions with the Bozeman TAC indicated that an additional alternative consisting of a two-lane street offset within the right-of-way required for a four-lane roadway should be considered. This alternative has been utilized in other portions of the city, most notably, for the reconstruction of Highland Boulevard.

Since initial traffic volumes may not require four-lane facilities, the alternatives for each project have been presented as two-lane roadways with corresponding four-lane versions. Typical layouts for each of the roadway alternatives considered for North 19th Avenue - Oak Street and Kagy Boulevard are illustrated in Figure 2 and 3, respectively.

All construction alternatives will require additional right-of-way acquisition along North 19th Avenue, Oak Street, and Kagy Boulevard to complete right-of-way corridors sufficient to accommodate traffic facilities. It is the desire of the local government and the highway agencies involved in the

projects to acquire a right-of-way corridor in each project area that will allow for the ultimate development of four-lane facilities. The acquisition of such corridors is desirable since much of the right-of-way necessary for the projects lies in relatively undeveloped areas and a significant cost savings may be realized if all necessary right-of-way is purchased initially rather than as needed.

Additional amounts of right-of-way will be required from both the east and west sides of the proposed alignment of North 19th Avenue. Projections of future traffic indicate that a four-lane facility will be needed by the design year on this section of roadway. It is also desirable to include design features such as shoulders, medians, sidewalks, and boulevards within the right-of-way to provide arterial continuity over the length of North 19th Avenue. Therefore, right-of-way corridors of 100 or 116 feet will be considered for North 19th Avenue in the EIS evaluations. Rights-of-way presently exist only at the east and west ends of the proposed Oak Street alignment. However, substantial amounts of right-of-way must be acquired to accommodate the proposed roadway improvements. Although projected design year traffic volumes on Oak Street are somewhat lower than those for North 19th Avenue, it is evident that a four-lane facility will be in place at some future date. The provision of design features identical to those included with the North 19th Avenue alternatives requires that similar right-of-way corridors be evaluated for Oak Street.

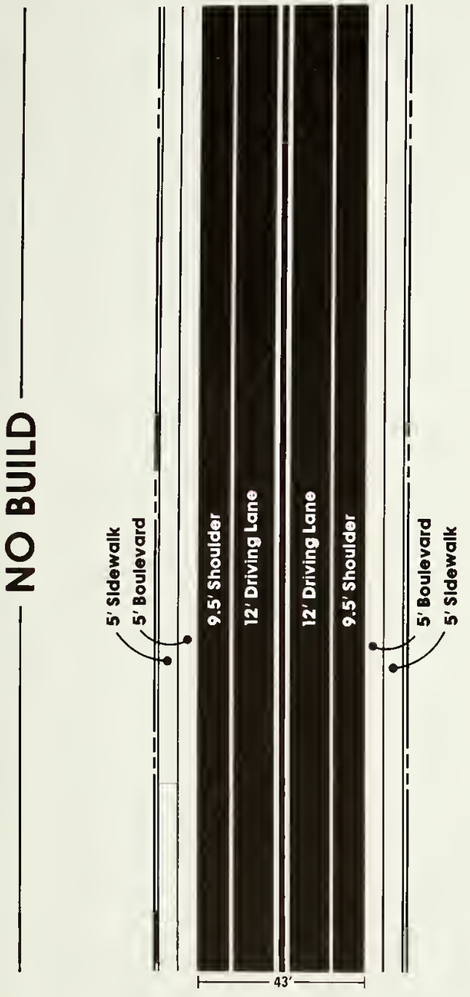
A right-of-way corridor sufficient for a four-lane roadway currently exists on Kagy Boulevard between South 11th and South Third Avenues. Varying amounts of right-of-way will be required from both sides of the proposed alignment of Kagy Boulevard between South 19th and South 11th Avenues to supplement existing rights-of-way. Much of the existing right-of-way in this area has been dedicated to ultimately become half of a 90-foot-wide right-of-way corridor. The previously completed section of Kagy Boulevard between South Third Avenue and Highland Boulevard utilizes the entire 90-foot-wide right-of-way corridor. Therefore, establishment of a 90-foot-wide right-of-way corridor is desirable for this Kagy Boulevard project.

It should be noted that the City of Bozeman has already established a precedent for the initial acquisition of rights-of-way sufficient to accommodate collector and arterial streets in developing areas of the community. The local government requires developers of lands adjacent to the city to dedicate an equitable amount of right-of-way (typically half of the specified amount) as a condition of annexation. This situation has already occurred in the North 19th Avenue project area as the developer of the Annie Subdivision was required to dedicate rights-of-way to accommodate improvements on North 19th Avenue and Durston Road. Similar developer dedications of right-of-way may occur along Oak Street and North 19th Avenue between Oak and Baxter Lane. Since funding limitations exist for both projects, it is likely that staged or "add-on" construction will be employed to develop the ultimate design for the traffic facilities. The initial acquisition of rights-of-way

ALT.1

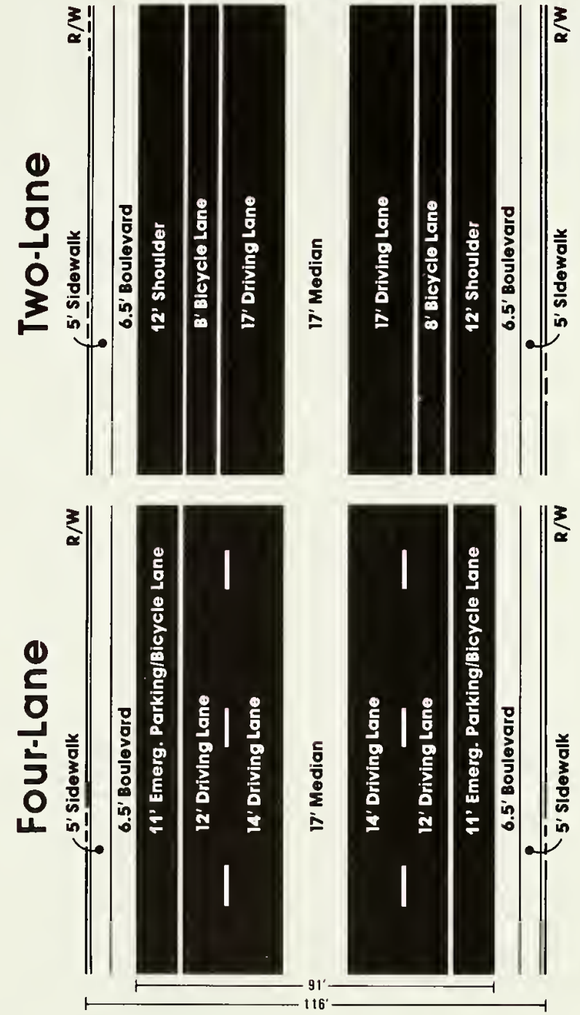
NO BUILD

ALT.2



ALTERNATIVE NO. 2: A 43-foot-wide two-lane street consisting of 12-foot driving lanes in each direction and two nine and one-half-foot shoulders that would accommodate emergency parking and bicycle traffic. This alternative would also include five-foot-wide boulevards and a five-foot-wide sidewalk on each side of the roadway. The alternative is similar to the collector street standard proposed by the City of Bozeman.

ALT.3

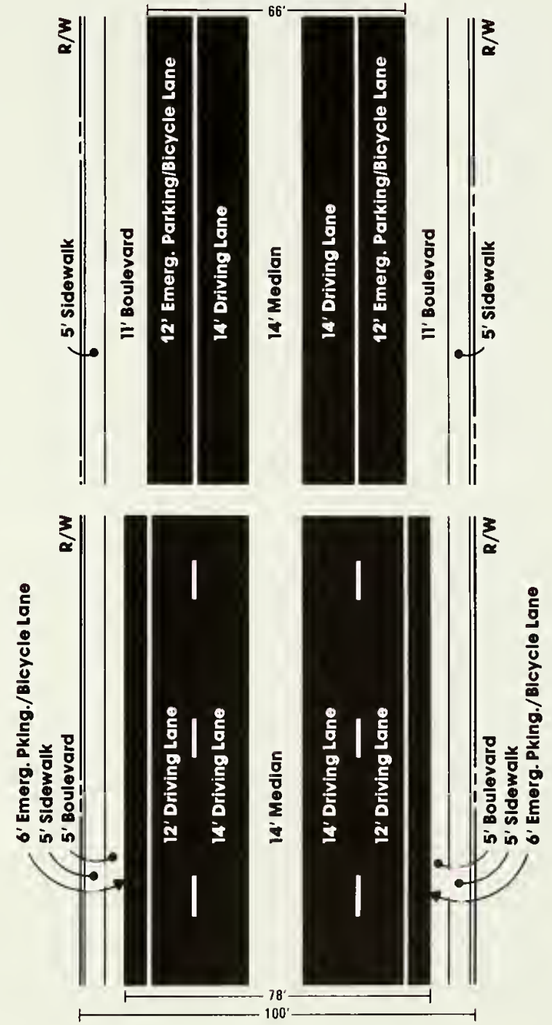


ALTERNATIVE NO. 3:

Two-Lane Version: A 91-foot-wide divided two-lane street consisting of two 17-foot driving lanes, two eight-foot bicycle lanes, two 12-foot shoulders, a 17-foot median, and a six and one-half-foot boulevard and a five-foot sidewalk on each side of the roadway. This alternative is similar to the portion of North 19th Avenue between Beall Street and Durston Road that was recently reconstructed.

Four Lane Version: A 91-foot-wide divided four-lane street consisting of two 14-foot driving lanes, two 12-foot driving lanes, two 11-foot emergency parking/bicycle lanes, a 17-foot median, two 6.5-foot boulevards, and a five-foot sidewalk on each side of the roadway.

ALT.4

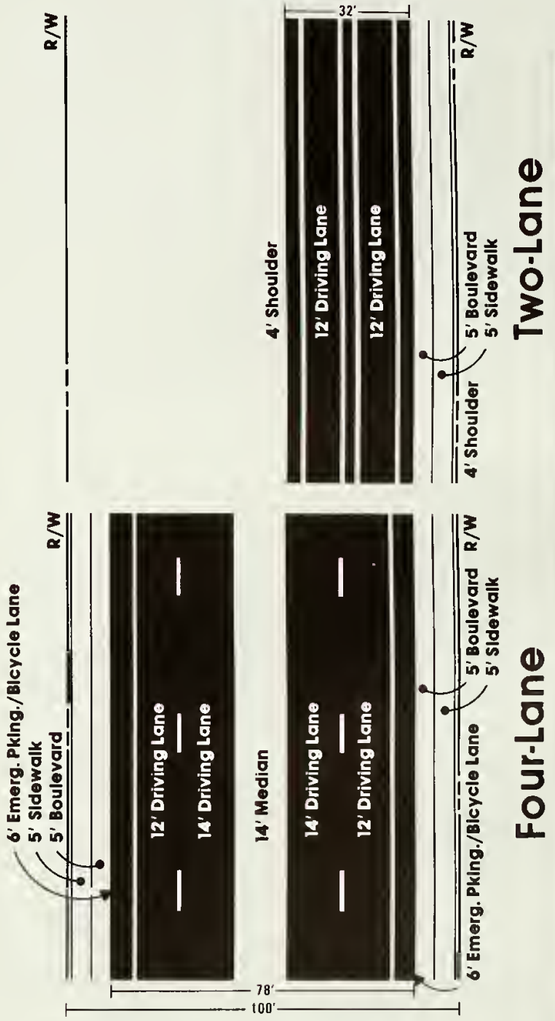


ALTERNATIVE NO. 4:

Two-Lane Version: A 66-foot-wide divided two-lane street consisting of two 14-foot driving lanes, two 12-foot emergency parking/bicycle lanes, a 14-foot median, two 11-foot boulevards, and a five-foot sidewalk on each side of the roadway.

Four-Lane Version: a 78-foot-wide divided four-lane street consisting of two 12-foot driving lanes, two 14-foot driving lanes, a 14-foot median, two six-foot bicycle/emergency parking lanes, and five-foot boulevards and sidewalks on each side of the roadway. This alternative is the arterial street standard proposed by the City of Bozeman.

ALT.5



ALTERNATIVE NO. 5:

Two-Lane Version: A 32-foot wide two-lane street consisting of two 12-foot driving lanes, two four-foot shoulders, a five foot boulevard and a five-foot sidewalk on one side of the roadway. The roadway would be offset in the right-of-way to provide two travel lanes and a shoulder for a future four-lane facility. This alternative is similar to the section recently constructed on Highland Boulevard.

Four-Lane Version: Two additional travel lanes, a median, boulevards, and sidewalks would be constructed within the right-of-way to provide a section similar to the arterial street standard proposed by the City of Bozeman. This alternative was identified by the Bozeman Policy Coordinating Committee as the preferred alternative for North 19th Avenue and Oak Street.

Typical Roadway Layout For Alternatives

RPA Graphics

North 19th Ave. - Oak St.

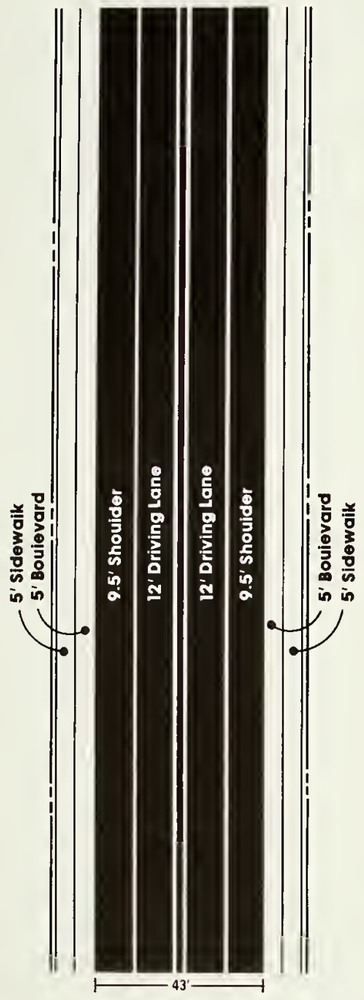
project M1299(1)

Figure 2

ALT.1

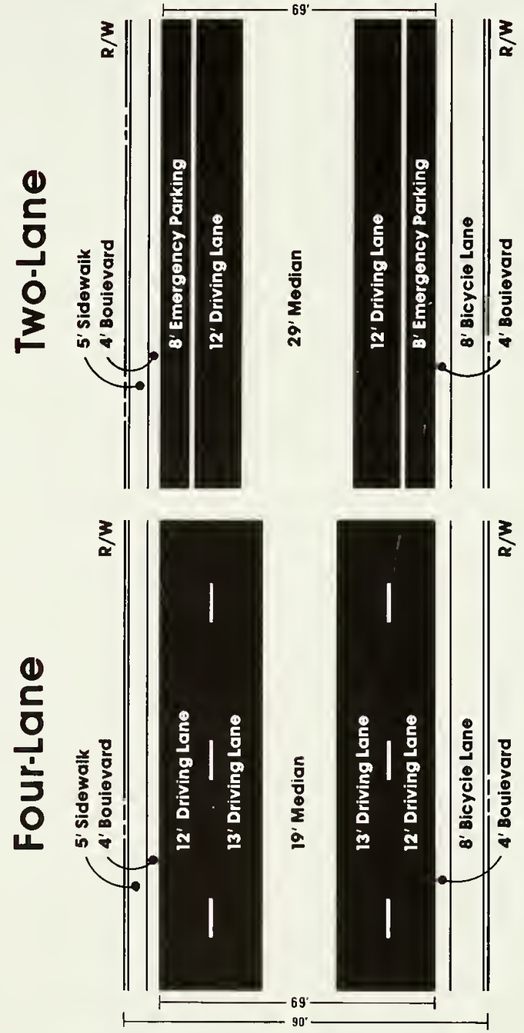
NO BUILD

ALT.2



ATERNATIVE NO. 2: A 43-foot-wide two-lane street consisting of 12-foot driving lanes in each direction and two nine and one-half-foot-wide shoulders that would accommodate emergency parking and bicycle traffic. This alternative would also include a five-foot-wide sidewalk on each side of the roadway. This alternative is similar to the standard for collector streets proposed by the City of Bozeman.

ALT.3

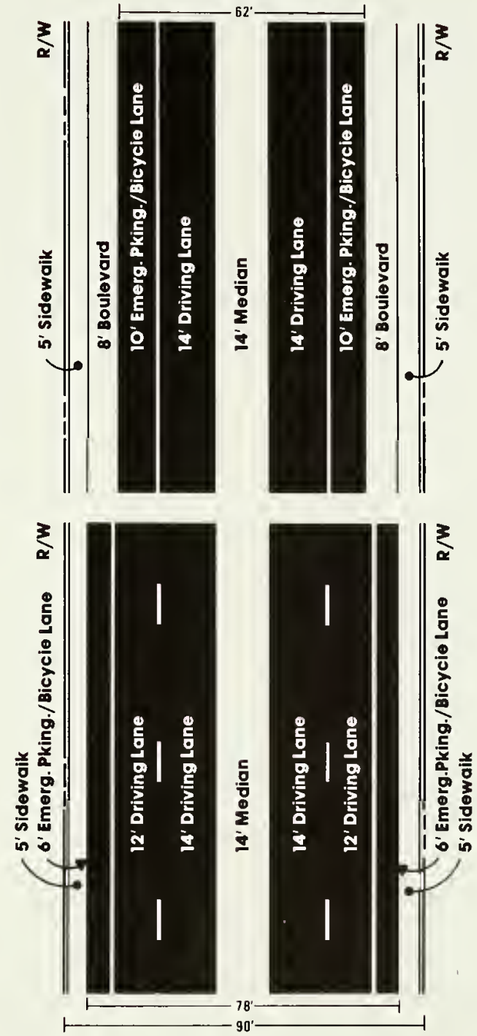


ALTERNATIVE NO. 3:

Two-Lane Version: A 69-foot-wide divided two-lane street consisting of two 12-foot driving lanes, two eight-foot emergency parking lanes, and a 29-foot median. In addition, the section includes two four-foot boulevards, a five-foot sidewalk, and an eight-foot-wide bicycle lane located on the side opposite of the sidewalk. This section was constructed on Kagy Boulevard between South Third Avenue and Highland Boulevard.

Four Lane Version: A 69-foot-wide four-lane street consisting of two 13-foot driving lanes, two 12-foot driving lanes, a 19-foot median, and a five-foot sidewalk and an eight-foot bicycle lane located on the side opposite the sidewalk. This section received consideration as an alternative for converting Kagy Boulevard east of South Third Avenue from a two-lane to a four-lane facility.

ALT.4

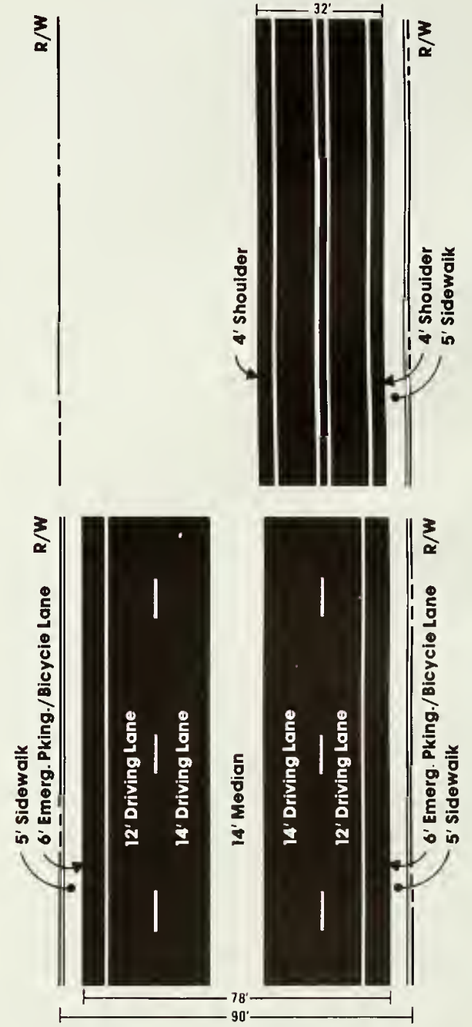


ALTERNATIVE NO. 4:

Two-Lane Version: A 62-foot-wide divided two-lane street consisting of two 14-foot driving lanes, two 10-foot emergency parking/bicycle lanes, a 14-foot median, two eight-foot boulevards, and a five-foot sidewalk on each side of the roadway. This alternative was identified by the Bozeman PCC as the preferred alternative for Kagy Boulevard.

Four Lane Version: A 78-foot-wide divided four-lane street consisting of two 14-foot driving lanes, two 12-foot driving lanes, two six-foot bicycle/emergency parking lanes, a 14-foot median, and five-foot back-of-curb sidewalks on both sides of the roadway. This section is similar to the arterial street standard proposed by the City of Bozeman but modified to fit in a 90-foot right-of-way by eliminating the five-foot boulevards.

ALT.5



ALTERNATIVE NO. 5:

Two-Lane Version: A 32-foot-wide two-lane street consisting of two 12-foot driving lanes, two four-foot shoulders and a five foot sidewalk on one side of the roadway. The roadway would be offset in the right-of-way to provide two travel lanes and a shoulder for a future four-lane facility. This alternative is similar to the section recently constructed on Highland Boulevard.

Four-Lane Version: Two additional travel lanes, a median, boulevards and sidewalks would be constructed within the right-of-way to provide a section similar to the arterial street standard proposed by the City of Bozeman but modified to fit within a 90-foot right-of-way.

Typical Roadway Layout For Alternatives

RPA Graphics

Kagy Boulevard

project M1212(4)

Figure 3

sufficient to accommodate all features of the ultimate design will minimize public expense and will help avert future right-of-way problems in the project areas.

Boulevards have been included as a design feature of many of the alternatives evaluated in this EIS to maintain a continuity in design between adjacent arterial roadways and the proposed projects. The City of Bozeman has employed boulevards in recently completed projects on North 19th Avenue, Kagy Boulevard, and Highland Boulevard. City personnel maintain that the boulevards are useful as snow storage areas during the winter months. Installation of boulevards will also serve to increase the distance between traffic-related noise and sensitive noise receptors.

Arterial streets are typically designed to permit running speeds of between 20 and 45 mph. Although through traffic on the arterials will be expedited to the extent feasible, it is equally important to consider the needs of local traffic. The design speed for urban arterials is dependent upon the frequency of intersections and the amount of cross and turning traffic but is generally 40 to 60 mph. The design speeds on less important urban arterials may be somewhat lower. The design speed for North 19th Avenue, Oak Street, and Kagy Boulevard will be 45 mph. The posted maximum speed on these routes is anticipated to be 35 mph; however, the speed limit should be determined by observations of travel speeds and should be consistent with conditions along the roadway. The recently constructed sections of the perimeter arterial system (North 19th Avenue, Kagy Boulevard, and Highland Boulevard) have posted speed limits of 25 mph.

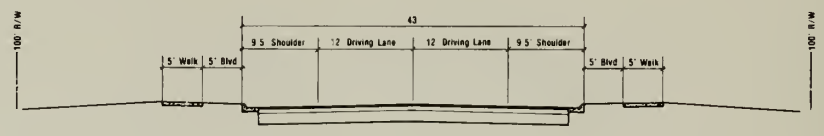
During the scoping process, it was determined that provisions should be made to accommodate pedestrians and bicyclists. Therefore, all roadway alternatives, with the exception of the "no-build" alternatives, will include such provisions. Five-foot-wide sidewalks will parallel the roadway for all construction alternatives. Crosswalks are proposed for all intersections likely to be signalized within the design life of the North 19th Avenue - Oak Street and Kagy Boulevard projects. Additional crosswalks will be considered on Kagy Boulevard in the vicinity of Reno H. Sales Stadium to handle pedestrian traffic between parking areas during special events. Design considerations for bicycle facilities vary by alternatives and range from use of the road shoulder to separated bicycle lanes. It is the general policy of the Department of Highways to include street lighting as a safety feature whenever raised medians are utilized.

Based on the input obtained through the scoping process and the data collected to date, the Consultant has determined that the following typical sections bracket the range of roadway alternatives that should be evaluated. A brief description of each alternative is summarized below.

1. North 19th Avenue - Oak Street Alternatives Project M1299(1)

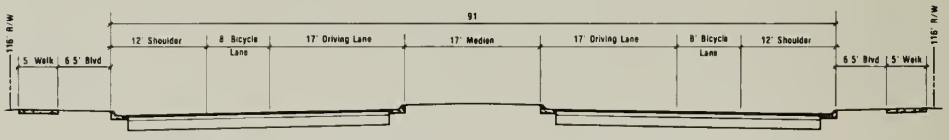
Alternative No. 1 "No-Build" Alternative. This alternative would not require any change to the project area. The right-of-way that has been acquired for the improvement project would be held in reserve for a future project or sold.

Alternative No. 2 A 43-foot-wide two-lane street consisting of 12-foot driving lanes in each direction and two nine and one-half-foot shoulders that would accommodate emergency parking and bicycle traffic. This alternative would also include five-foot-wide boulevards and a five-foot-wide sidewalk on each side of the roadway. The alternative is similar to the collector street standard proposed by the City of Bozeman.

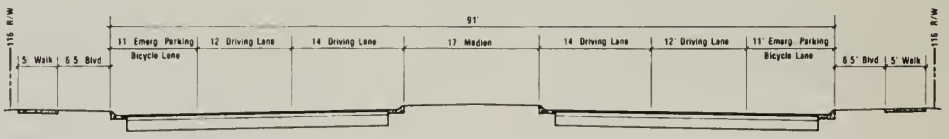


Alternative No. 3

Two-Lane Version: A 91-foot-wide divided two-lane street consisting of two 17-foot driving lanes, two eight-foot bicycle lanes, two 12-foot shoulders/emergency parking lanes, a 17-foot median, and a six and one-half-foot boulevard and a five-foot sidewalk on each side of the roadway. This alternative is similar to the portion of North 19th Avenue between Beall Street and Durston Road that was recently reconstructed.

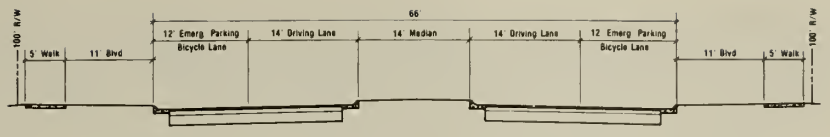


Four-Lane Version: A 91-foot-wide divided four-lane street consisting of two 14-foot driving lanes, two 12-foot driving lanes, two 11-foot emergency parking/bicycle lanes, a 17-foot median, two six and one-half-foot boulevards, and a five-foot sidewalk on each side of the roadway.

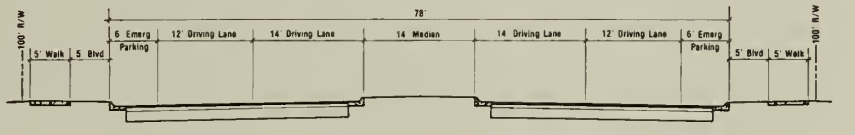


Alternative No. 4

Two-Lane Version: A 66-foot-wide divided two-lane street consisting of two 14-foot driving lanes, two 12-foot emergency parking/bicycle lanes, a 14-foot median, two 11-foot boulevards, and a five-foot sidewalk on each side of the roadway.

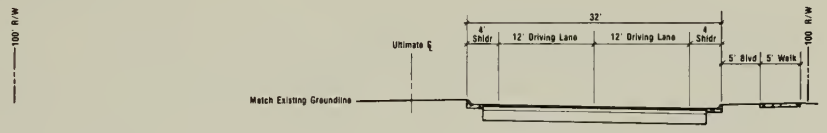


Four-lane Version: A 78-foot-wide divided four-lane street consisting of two 12-foot driving lanes, two 14-foot driving lanes, a 14-foot median, two six-foot bicycle/emergency parking lanes, and five-foot boulevards and sidewalks on each side of the roadway. This alternative is the arterial street standard proposed by the City of Bozeman.



Alternative No. 5

Two-lane Version: A 32-foot-wide two-lane street consisting of two 12-foot driving lanes, two four-foot shoulders, a five-foot boulevard, and a five-foot sidewalk on one side of the roadway. The roadway would be offset in the right-of-way to provide two travel lanes and a shoulder for a future four-lane facility. This alternative is similar to the section recently constructed on Highland Boulevard.



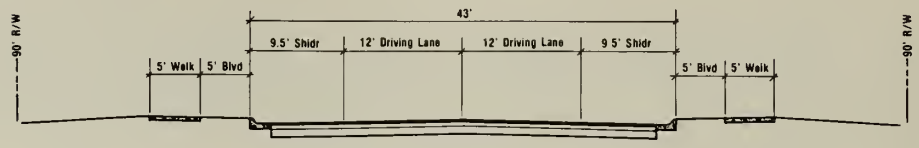
Four-Lane Version: Two additional travel lanes, a median, boulevards, and sidewalks would be constructed within the right-of-way to provide a section similar to the arterial street standard proposed by the City of Bozeman.

See Typical Section Four-Lane Version Alternative No. 4

2. Kagy Boulevard Alternatives Project M1212(4)

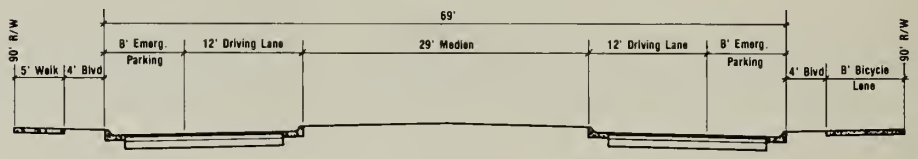
Alternative No. 1 "No-Build" Alternative. This alternative would not require any change to the gravel-surfaced or 24-foot-wide paved roadway that currently exist in the Kagy Boulevard project area. The planned arterial link between Highland Boulevard and South 19th Avenue would remain uncompleted. The right-of-way that has been acquired for the improvement project would be held in reserve for a future project or sold.

Alternative No. 2 : A 43-foot-wide two-lane street consisting of 12-foot driving lanes in each direction and two nine and one-half-foot-wide shoulders that would accommodate emergency parking and bicycle traffic. This alternative would also include a five-foot-wide sidewalk on each side of the roadway. This alternative is similar to the standard for collector streets proposed by the City of Bozeman.

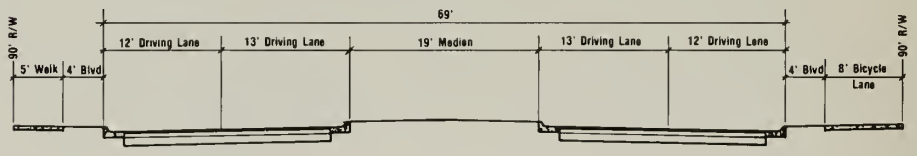


Alternative No. 3

Two-Lane Version: A 69-foot-wide divided two-lane street consisting of two 12-foot driving lanes, two eight-foot emergency parking lanes, and a 29-foot median. In addition, the section includes two four-foot boulevards, a five-foot sidewalk, and an eight-foot-wide bicycle lane located on the opposite side of the sidewalk. This section was constructed on Kagy Boulevard between South Third Avenue and Highland Boulevard.

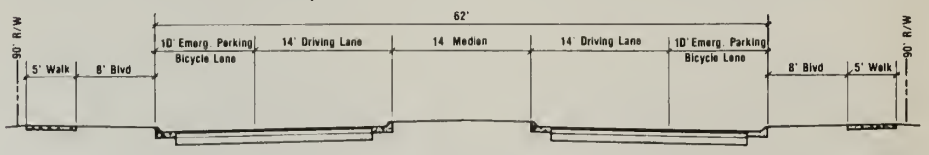


Four-Lane Version: A 69-foot-wide four-lane street consisting of two 13-foot driving lanes, two 12-foot driving lanes, a 19-foot median, and a five-foot sidewalk and an eight-foot bicycle lane located on the side opposite the sidewalk. This section received consideration as an alternative for converting Kagy Boulevard east of South Third Avenue from a two-lane to a four-lane facility.



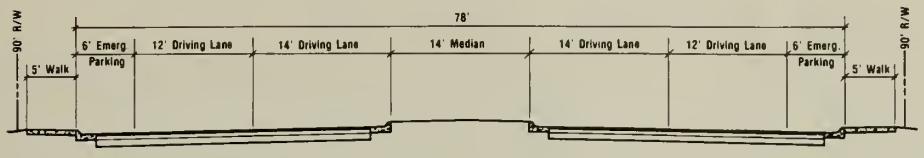
Alternative No. 4

Two-Lane Version: A 62-foot-wide divided two-lane street consisting of two 14-foot driving lanes, two 10-foot emergency parking/bicycle lanes, a 14-foot median, two eight-foot boulevards, and a five-foot sidewalk on each side of the roadway.



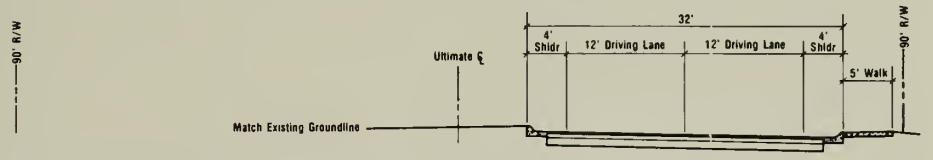
Four-Lane Version: A 78-foot-wide divided four-lane street consisting of two 14-foot driving lanes, two 12-foot driving lanes, two six-foot bicycle/emergency

parking lanes, a 14-foot median, and five-foot-back-of-curb sidewalks on both sides of the roadway. This section is similar to the arterial street standard proposed by the City of Bozeman but modified to fit in a 90-foot right-of-way by eliminating the five-foot boulevards.



Alternative No. 5

Two-Lane Version: A 32-foot-wide two-lane street consisting of two 12-foot driving lanes, two four-foot shoulders, and a five-foot sidewalk on one side of the roadway. The roadway would be offset in the right-of-way to provide two travel lanes and a shoulder for a future four-lane facility. This alternative is similar to the section recently constructed on Highland Boulevard.



Four-Lane Version: Two additional travel lanes, a median, boulevards and sidewalks would be constructed within the right-of-way to provide a section similar to the arterial street standard proposed by the City of Bozeman but modified to fit within a 90-foot right-of-way.

See Typical Section Four-Lane Version Alternative No.4

An alternative incorporating Transportation System Management (TSM) improvements was not included for evaluation since the North 19th Avenue - Oak Street and Kagy Boulevard projects primarily involve new construction through areas with minimal or no traffic facilities. No consideration was given to an alternative including mass transit because such services are not provided by any local government or private agency.

C. Proposed Actions

The selection of a specific preferred alternative for North 19th Avenue - Oak Street and Kagy Boulevard is the joint responsibility of local governmental officials (TAC and PCC), the Montana Department of Highways, and the Federal Highway Administration. Several meetings were held with members of each group during the preparation of the EIS in an effort to identify the most appropriate design alternative for each project area. The selections of preferred alternatives for Projects M1299(1) and M1212(4) were based on a number of major considerations including: right-of-way limitations; projected design year traffic volumes; capacity requirements; design continuity; funding limitations; and private contributions towards roadway development in the project areas. The following narrative describes the preferred alternatives for the North

19th Avenue - Oak Street and Kagy Boulevard projects. Right-of-way acquisition and the estimated construction costs for the preferred alternatives are contained in Part IV: Environmental Consequences, Section H, "Summary of Costs".

1. North 19th Avenue - Oak Street

The Bozeman Policy Coordinating Committee, at the recommendation of TAC, identified the four-lane version of Alternative 4/5 (which are identical) as the preferred design alternative for North 19th Avenue from Durston Road to Oak Street.[1] This alternative was selected because projected design year traffic on this portion of North 19th Avenue will require a four-lane facility to function effectively. The wider four-lane option (Alternative 3) would require that substantially more right-of-way (16 feet of additional right-of-way width) be purchased adjacent to the proposed roadway and would require the taking of a farmhouse at the northwest corner of Durston Road and North 19th Avenue. PCC recommended that the typical roadway section of the preferred alternative be restriped to delineated four 12-foot-wide driving lanes and two eight-foot-wide shoulders. The proposed restriping is consistent with AASHTO guidelines for urban arterials and will provide a more desirable shoulder area at no additional cost. It should be noted that North 19th Avenue from Main Street to Durston Road must be restriped as a four-lane roadway to maintain efficient traffic flows upon the completion of Project M1299(1).

[1] Formal motion passed by the Bozeman Policy Coordinating Committee at its April 10, 1986 meeting.

PCC also identified the four-lane version of Alternative 4/5 as the preferred alternative for Oak Street between North 19th and North Seventh Avenues. Although projected design year traffic volumes on Oak Street could be accommodated by a somewhat lesser facility, the preferred alternative will provide traffic flow and traffic safety benefits since the North 19th - Oak Street arterial will provide an alternate route from I-90 to West Main Street for truck traffic. The flexibility offered by the four-lane facility was also an important selection factor due to the development potential that the Oak Street area possesses and the possibility that future traffic volumes may approach those on North 19th Avenue if an I-90 interchange on the west edge of Bozeman is not constructed. PCC recommended that Oak Street be restriped in the same manner as that proposed for North 19th Avenue.

One of the primary considerations in the selection of preferred alternatives for North 19th Avenue and Oak Street was private contributions toward roadway installation. Developers of properties adjacent to North 19th Avenue - Oak Street have donated right-of-way for the construction of the roadways as a condition of annexation by the City of Bozeman. In addition, the City has required the developers of these parcels to provide access roads prior to granting approvals for further site development. Negotiations between the local government and the developers have produced an agreement to construct 28-foot-wide paved roadways offset to the north side of the Oak Street right-of-way corridor and to the west side of the right-of-way for North 19th Avenue. The initial roadway construction on Oak

Street will extend from North Seventh Avenue to the future North 19th Avenue and may be initiated as early as the summer of 1986.[2] Initial construction of North 19th Avenue by developers will occur; however, no firm date for construction has been established at this time.

[2] Dick Holmes, City of Bozeman Public Works Director in proceedings of TAC meeting April 10, 1986.

The Bozeman TAC and PCC has identified a preferred alternative for North 19th Avenue - Oak Street that will incorporate as much of the initial private construction into the ultimate roadway design as possible. The proposed placement of the roadways to one side of the right-of-way will comprise the initial stage of the development of the preferred alternative and should result in project cost reductions. Federal Aid Urban funds will be utilized initially to acquire the necessary right-of-way corridor for North 19th Avenue - Oak Street. FAU funds will be utilized in the future to augment the existing facilities and develop the ultimate four-lane traffic facilities on North 19th Avenue and Oak Street.

Figures 4 and 5 show the preliminary design layouts of the preferred alternatives for North 19th Avenue and Oak Street. These figures are intended to illustrate many of the design features of the project such as right-of-way limits, access, and lane use configurations. The purpose of these figures is to provide a basis for evaluation of potential impacts and are not intended to be the final designs for the project.

2. Kagy Boulevard

The Bozeman PCC, at the recommendation of TAC, identified the two-lane version of Alternative 4 as the preferred alternative for Kagy Boulevard Project M1212(4).[3] This alternative will be constructed from South 19th Avenue to the termination of the previous Kagy Boulevard improvement project just west of Greek Way. The PCC action also recommended that the typical section for this alternative be modified somewhat to provide a 14-foot-wide painted median instead of a raised median with curbs. Due to financial limitations, it is likely that this Kagy Boulevard project will be stage constructed. PCC and TAC recommended that the initial construction be undertaken from South 19th Avenue to South 11th Avenue and consist of the installation of a 58-foot-wide "rural" pavement section with drainage channels paralleling each side of the roadway. Subsequent stages would include construction of the ultimate roadway section (including curbs and gutters, sidewalks, and drainage facilities) between South 11th Avenue and Greek Way; installation of curb and gutter, sidewalks, and the drainage facilities between South 19th and South 11th Avenues; and signalization of major intersections along Kagy Boulevard. FAU funds are expected to be the major, if not the only, source of funding for this project.

[3] Formal motion passed by the Bozeman Policy Coordinating Committee at its April 10, 1986 meeting.

The two-lane version of Alternative 4 was selected as the preferred alternative for Kagy Boulevard because it will accommodate projected design year traffic volumes and incorporates design features that are consistent with those already installed on other segments of Bozeman's perimeter arterial road

system. The preferred alternative will require that varying amounts of right-of-way be acquired between South 19th and South 11th Avenues. Project construction will require one residential relocation near the intersection of Willow Way and Kagy Boulevard.

None of the Kagy Boulevard intersections will initially require signalization; however, the intersections with South 19th, South 11th, South Seventh, and Willson Avenue will require signalization during the design life of the facility. The provision of left turn lanes in the median at all intersections will ensure that the roadway functions effectively during its initial operating years. Figure 6 depicts the preliminary design layout of the preferred alternative for Kagy Boulevard.

It should be noted that the preliminary designs of the preferred alternatives shown in Figures 4, 5, and 6 have been prepared to provide a basis of evaluation of potential impacts and is not intended to be the final design for the project. The preferred alternatives described in this environmental impact statement are the courses of action which have been determined to be the most desirable in terms of balancing functional efficiency with environmental, social, and economic effects. It must be stressed that this selection of preferred alternatives is subject to revision and re-evaluation based upon comments received during the public involvement process or any additional studies or information which may become available. Any comments or information which would assist in such re-evaluation is specifically invited.

D. Access Control

Unrestricted access impedes the flow of traffic and endangers public safety on high design traffic facilities. Therefore, it is necessary and desirable to limit the access onto major urban roadways. Since North 19th Avenue, Oak Street, and Kagy Boulevard have been designated as arterial streets, both projects are proposed to be constructed as limited access facilities with emergency parking only. The Montana Department of Highways, the Federal Highway Administration, and the Bozeman TAC have expressed their concurrence with this design proposal. The Bozeman PCC formally adopted TAC's recommendation of limited access for the project in its October 17, 1985 action. PCC requested that the Montana Department of Highways and the City of Bozeman jointly develop an access control plan for these arterial streets.[4]

[4] Formal motion, Bozeman PCC at its October 17, 1985 meeting.

The access control plan will maintain accesses to all public side street intersections and alleys. It is desirable to provide access only to private residences and businesses that cannot gain access to the property from an adjacent street or alley. In cases where the only possible access to a private parcel is directly from the arterial street, a single access point (driveway) is desirable. After an access control plan has been developed, the Montana Department of Highways will attempt to acquire access rights through negotiations with

Preliminary Design of Preferred Alternative

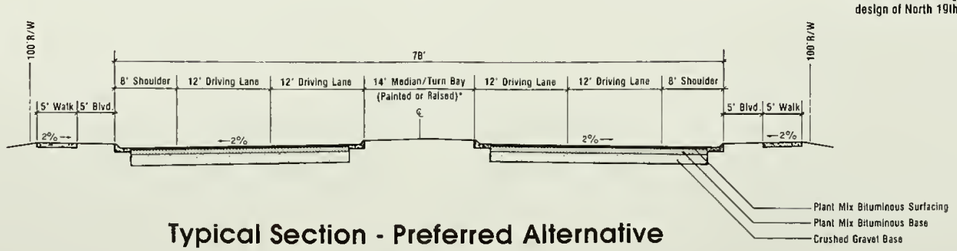
RPA Graphics

Project M1299(1)

North 19th Avenue
Durston Rd. to Baxter Ln.

Figure 4

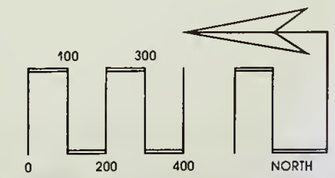
NOTE: This Figure shows a preliminary design that was prepared for the E.I.S. The purpose of the preliminary design is only to provide a basis of evaluation for potential impact, and is not intended to be the final design for the project.



*Decision to incorporate raised median or painted median will be made during the final design of North 19th Avenue.

Typical Section - Preferred Alternative

No Scale



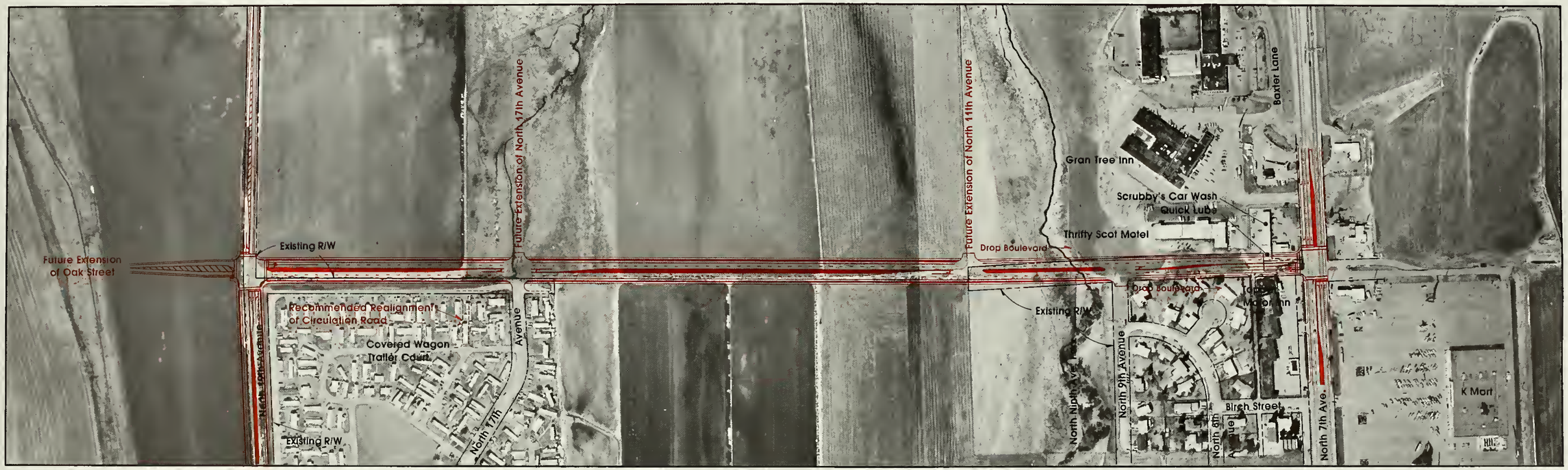
Preliminary Design of Preferred Alternative

RPA Graphics

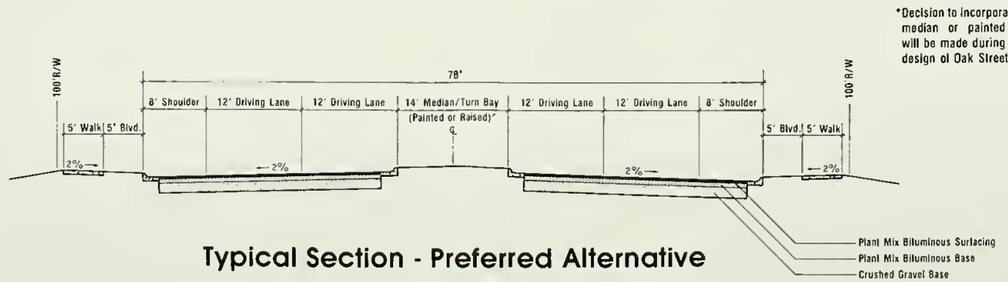
Project M1299(1)

Oak Street
N. 19th Ave. to N.7th Ave.

Figure 5



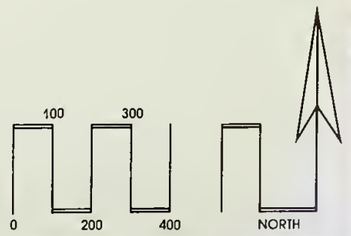
NOTE: This Figure shows a preliminary design that was prepared for the E.I.S. The purpose of the preliminary design is only to provide a basis of evaluation for potential impact, and is not intended to be the final design for the project.



Typical Section - Preferred Alternative

No Scale

*Decision to incorporate raised median or painted median will be made during the final design of Oak Street.



Preliminary Design of Preferred Alternative

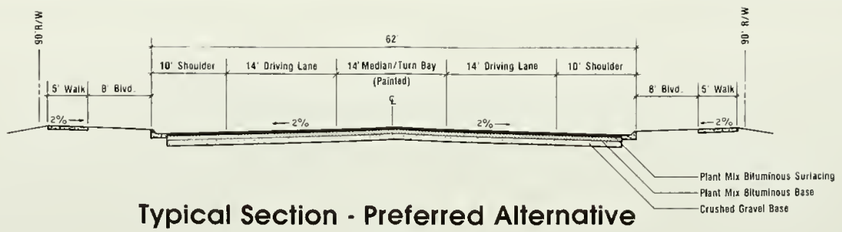
RPA Graphics

Project M1212(4)

Kagy Boulevard
S. 19th Ave. to S. 3rd Ave.

Figure 6

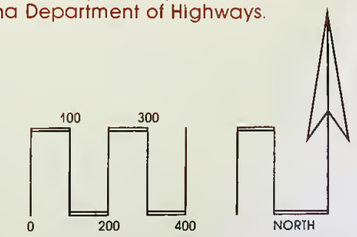
NOTE: This Figure shows a preliminary design that was prepared for the E.I.S. The purpose of the preliminary design is only to provide a basis of evaluation for potential impact, and is not intended to be the final design for the project.



Typical Section - Preferred Alternative

No Scale

Note: The intersection design shown at Kagy Boulevard - South 3rd Ave. - Willson Avenue has been proposed by the Consultant and does not represent any planned or committed improvements by the City of Bozeman or the Montana Department of Highways.



each landowner. The negotiation procedure assures that landowners will be compensated for any changes required in their access.[5] The authority and implementation of limited access is accomplished by a resolution passed by the Montana Highway Commission. Limited access was discussed at the public hearing held on April 23, 1986. Future public meetings regarding the issue will be conducted only at the discretion of and by the City of Bozeman.

[5] "Limited Access Highways - Questions and Answers", MDDH pamphlet.

Part III: Affected Environment

A. Introduction

The environmental impacts associated with the roadway alternatives can be accurately assessed only after the current environmental conditions of the study area have been identified. The existing environmental conditions were generally categorized for purposes of analysis into the physical, biological, and human environment. Cultural, recreational, and visual resources were also considered, as were other areas or issues determined to be environmentally sensitive. Within each category, those features judged to be significant and/or required by regulations were addressed. This evaluation process required reviews of current literature and documented studies and utilization of information received at public meetings.

B. Physical Environment

1. Climate

The study area is located at the east end of a broad river basin drained by the East Gallatin, Gallatin, Madison, Jefferson, and Missouri Rivers. Local topography ranges from approximately 4,700 feet in elevation on the valley floor to more than 9,500 feet in the mountains surrounding Bozeman. This range in topographic conditions produces considerable variations in climate throughout portions of the Gallatin Valley. The prevalent west to southwest winds flowing over the mountains surrounding the valley provide the highest annual precipitation in the Bridger, Gallatin, and Madison Ranges with valley areas experiencing much lower amounts of precipitation. In general, precipitation in Bozeman occurs as steady rains during the spring months of April through June, intermittent showers during the summer and fall months, and as snow fall during the winter. Mean annual precipitation in Bozeman is approximately 18.5 inches. The majority of the precipitation in valley areas occurs during the growing season, whereas precipitation in the mountainous areas occurs throughout the year.

Temperatures in the Gallatin Valley may vary significantly throughout the year. Mean annual temperature for Bozeman is approximately 43 degrees, with the highest recorded temperature being 112°F and the lowest recorded temperature being -53°F. The warmest periods of the year typically occur during July and August while January and February are the coldest months of the year.

2. Geology and Soils

a. Geology

The Gallatin Valley is part of the Three Forks structural basin of the northern Rocky Mountain physiographic province. The

Three Forks structural basin is characteristic of many high intermountain basins of the province and was probably formed more than 19 million years ago. Since that time (Miocene epoch), the basin was subjected to a continuation of down-faulting along structural boundaries or a downwarping of the entire basin. Hundreds of feet of sediments from adjacent highlands and from falling volcanic ash were deposited in lakes or on surface areas of the basin. These strata constitute the majority of the valley fill. Extensive erosion of these materials occurred as a result of surface drainage during late tertiary time (less than five million years ago). A surface layer of alluvium was deposited over much of the basin in recent geologic time (less than 10,000 years ago).

The Bridger Range, a high mountain range located northeast of Bozeman, is composed of rocks ranging in age from Precambrian to Cretaceous (four billion years to 70 million years old). Faulting along the west side of the Bridger Range is believed to have elevated the range with respect to the remainder of the Gallatin Valley. The valley is bounded on the south by the Gallatin and Madison Ranges. These mountains are typically composed of Precambrian gneiss and blocks of Paleozoic and Mesozoic rocks (70 million to 20 million years old) which have been tightly folded.

The geologic formation which will directly be encountered as a result of roadway construction on North 19th Avenue - Oak Street and Kagy Boulevard is alluvial fan deposits. This material primarily consists of silt, sand, gravel, and other materials deposited as outwash from adjacent mountains. This material locally varies with respect to bedding thickness, porosity, and permeability.

b. Faults

No faults are known to exist within the study areas for the North 19th Avenue - Oak Street or Kagy Boulevard projects. Known faults lie to the northeast of Bozeman along the west flank of the Bridger Mountains and to the south along the front of the Gallatin Range.

c. Landforms/Soils

The soils within the study areas are associated with depositional landforms resulting from fluvial processes in nearby mountains. The silt, sand, and gravel materials deposited in alluvial fans at the base of the mountains has been modified over time by climate, topography, and organisms to form the present soils found in the project study areas. The geologic parent materials of each soil grouping determines its physical and chemical makeup and facilitates predictions of soil properties, potentials, and limitations. Three soils, Bozeman silt loam, Huffine silt loam, and Huffine silt loam, poorly drained phase, have been identified and mapped in each project area. One additional soil, Gallatin silt loam, may be encountered during construction of Oak Street. A discussion of each soil is included in the following narrative.[1]

[1] Ronald J. Nadwornick, District Conservationist, USDA Soil Conservation Service in a personal communication February 25, 1985.

1) BOZEMAN SILT LOAM (North 19th - Oak Street and Kagy Boulevard)

This soil occurs almost exclusively in the vicinity of Bozeman and appears to have developed over silty lacustrine deposits. The soil is dark colored in areas where organic materials once accumulated and permeability is slow. The soil has a moderate rating for load bearing capacity and frost heave potential. Depth to bedrock and groundwaters is greater than six feet. The soil is productive and well suited for cultivation.

2) GALLATIN SILT LOAM (Oak Street)

This soil is found in drainages of the East Gallatin River and typically comprised of dark brown or black silt loam. The soil is moderately permeable and may have a high organic content. The shrink-swell potential of the soil is low, and the frost heave potential is severe. The soil has moderate limitations for load bearing capacity. The depth to bedrock is greater than six feet; however, groundwater may be found at less than three feet in localized areas of this soil.

3) HUFFINE SILT LOAM (North 19th - Oak Street and Kagy Boulevard)

This soil is found extensively in the Bozeman area and consists of silt loam with varying gravel content which influences drainage and depth to groundwater. The soil may have a seasonally high water table resulting in a severe frost heave potential. The soil has a moderate to rapid permeability and a low shrink-swell potential. The soil is very productive for agricultural uses.

4) HUFFINE SILT LOAM, POORLY DRAINED (North 19th - Oak Street and Kagy Boulevard)

The poorly drained phase of the Huffine silt loam is found in the shallow sloughs, depressions, drainage ways, and the broad, low flats where surface or groundwaters collect. The soil is similar in character to the typical soil; however, it may be shallower and contain more gravel. Soil limitations are similar to the Huffine silt loam although this soil may become locally boggy where clay has been deposited over subsurface gravels.

d. Prime and Unique Agricultural Lands

Consultations with the U.S. Department of Agriculture, Soil Conservation Service in Bozeman indicated that prime or unique agricultural lands have not been designated at this time due to the lack of a soil survey within the project study area.[2] In the opinion of SCS, the Bozeman and Huffine soils would fit into the classification; however, these lands are adjacent to or part of the City of Bozeman and have been designated for future urban development in the Bozeman Area Master Plan. Since these lands are currently planned or will be planned for

[2] Glen Loomis, State Conservationist, USDA Soil Conservation Service, Bozeman, in a personal communication April 7, 1986.

development activities in the future, SCS does not recognize them as farmlands. Therefore, the Farmland Protection Policy Act does not apply.

3. Water Resources and Quality

Both surface water and groundwater resources exist in the project area. Surface water courses adjacent or traversing the Oak Street, North 19th Avenue, and Kagy Boulevard corridors consist of small intermittent or continuous drainages, irrigation canals, and drain ditches. Groundwater underlies the area at shallow to moderate depths. All surface water courses in the project area drain northward to the East Gallatin River.

Flow and water quality data exist for both groundwater and surface water resources through computer files and published data from the Montana Department of Health and Environmental Sciences (MDHES), Montana Department of Natural Resources and Conservation (MDNRC), Unites States Geological Survey (USGS), and the Montana Bureau of Mines and Geology. This information has been used in the compilation of the following comments.

a. Surface Waters

The surface water resources in proximity to the project corridors are shown in Figure 7. These lie within the East Gallatin River drainage, a tributary to the Gallatin River and, ultimately, the Missouri River. The waters addressed in this section are those that, by virtue to their proximity to Oak Street, North 19th Avenue, or Kagy Boulevard, may be impacted by the proposed project. Other outlying surface waters can be excluded from consideration because of their remoteness from the study corridor and the inability of project area drainage to reach them.

1) EAST GALLATIN RIVER

The East Gallatin River is formed at the confluence of Rocky Creek and Bear Canyon Creek approximately three miles east of Bozeman and flows in a northwesterly direction to join the Gallatin River near Manhattan. The East Gallatin River is designated as a "B-2" stream with respect to water quality by MDHES. (A definition of this classification is contained in the glossary.) Average flow in the East Gallatin at Bozeman is 88.4 cfs; seasonal runoff peaks as high as 1,240 cfs have been recorded.[3]

The quality of the East Gallatin River is documented by MDHES data.[4] Suspended solids and sediment in the river are generally low except during major runoff events. The water temperature is consistently low, and the dissolved oxygen concentration remains high, supporting a substantial trout fishery. Trace concentrations of heavy metals are low. Chlorides, organic salts, coliform organisms, nitrates, and ammonia are all low indicating the absence of appreciable contamination.

The river currently receives stormwater runoff from the Bozeman municipal area, and the Bozeman municipal wastewater

[3] "Surface Water Supply of the U.S. (1966-70) - Peak Flows in the Upper Missouri River Basin", U.S. Dept. of Interior, USGS, 1975.

[4] MDHES "STORET" computer file data retrieval August 26, 1986.

treatment plant discharges to the river northwest of the city. Reconstruction and upgrading of this plant was just completed in 1984 with Environmental Protection Agency (EPA) assistance, and the plant is now fully capable of meeting the water quality requirements of its MDHES Discharge Permit, predicated on the statewide stream non-degradation policy.

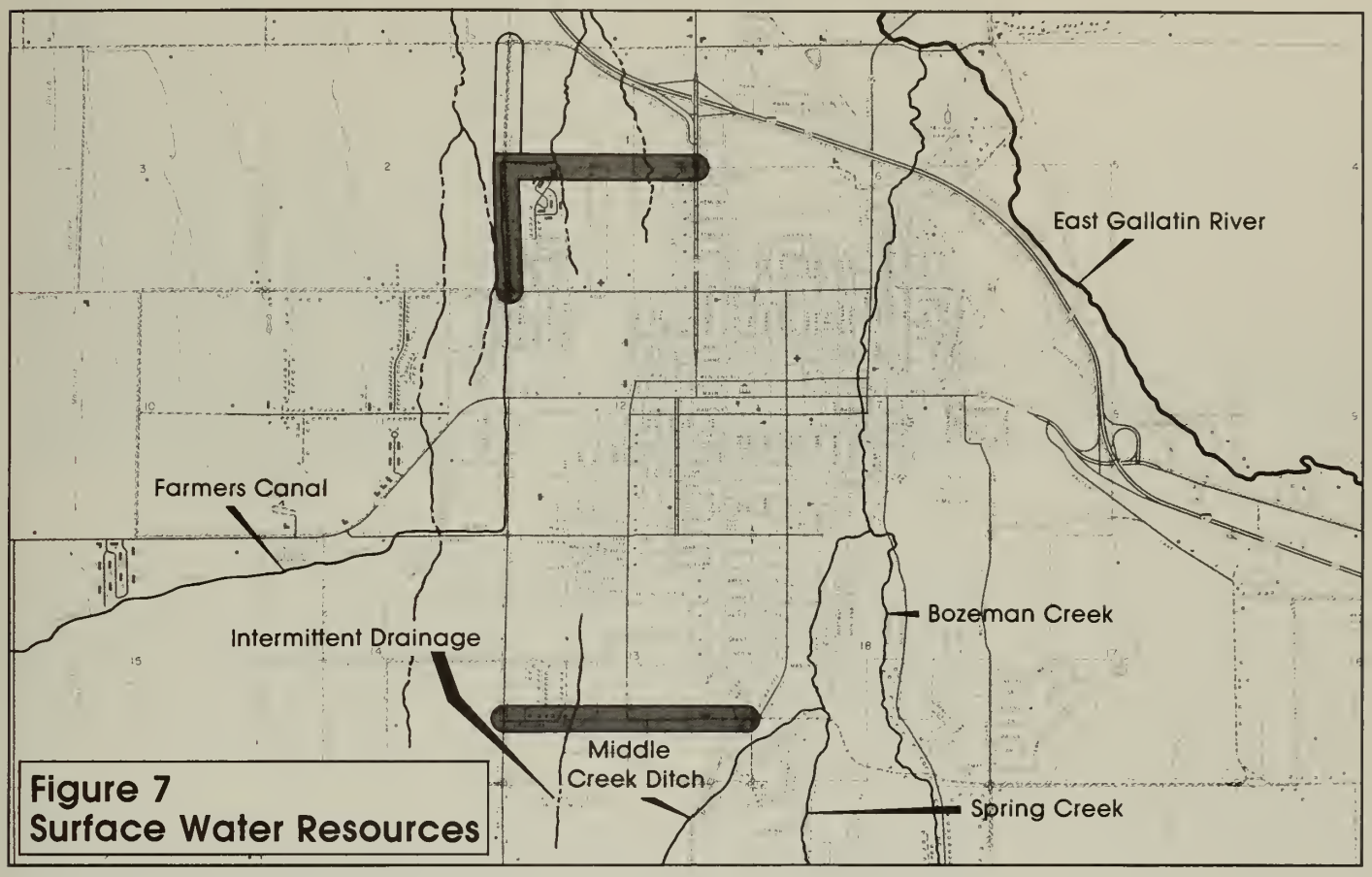


Figure 7
Surface Water Resources

2) PERMANENT STREAMS AND DRAINAGES

One continuously flowing, unnamed natural stream crosses the project corridors about midway along the Oak Street alignment (see Figure 7). This stream is small, i.e., less than five cfs, except during major runoff events and is not a part of the headwaters of the East Gallatin River as defined by the U.S. Army Corps of Engineers for Section 404 purposes. Its channel meanders through agricultural grassland and pasture with grassed banks and a bed composed of mixed soil and gravel. Water quality, while previously undocumented due to its small size, appears good with low turbidity and temperature. Measurements taken in the course of this investigation indicate a springtime (April 30, 1985) temperature of 15°C, a dissolved oxygen content of 13.4 ppm, and a low conductivity reading indicating minimal dissolved solids. At the time of these measurements, stream flow was measured at one cfs.

Channel gradient is adequate to promote good stream velocity and prevent stagnation and excessive algae growth. The absence of prolific algae further indicates an absence of pollution from organic sources. The water quality of the stream appears

at least equal to that of the East Gallatin River to which it drains.

3) INTERMITTENT STREAMS AND DRAINAGES

An intermittent, unnamed drainage crosses the west end of the Kagy Boulevard alignment in the Willow Way area (see Figure 7). The drainage flows only seasonally and predominantly carries runoff from adjacent agricultural land. During periods of no flow, the drainage remains damp and intermittently boggy. Based on channel size and configuration, peak runoff flows are not sizeable. This drainage does not constitute a part of the headwaters of the East Gallatin River by Corps of Engineers' definition.

No water quality data is recorded for this drainage, and the absence of flow during these investigations prevented any field determinations. Based on similar drainages in the area, it can be presumed that water quality varies appreciably and is typical of agricultural runoff in the Bozeman Valley.

Approximately one-quarter mile north of the proposed Kagy Boulevard alignment, this intermittent drainage joins a continuously flowing stream that flows through Montana State University lands. The stream has an observed water quality that is typical of spring creeks. The water in the stream runs clean and cold, except during periods of excessive runoff, and is known to support the growth of watercress. The Bozeman Area Master Plan designates this drainage as a stream corridor in its land use plan and encourages the protection of both its water quality and appearance.

4) FARMERS CANAL

The Farmers Canal is a private irrigation canal owned by the Farmers Canal Company. The canal flows northeasterly from the Gallatin River through the western portion of Bozeman to its terminus near the northwest corner of the city (see Figure 7). Flow in the canal coincides with the irrigation season. The canal parallels the proposed alignment of North 19th Avenue from Durston Road to Oak Street and parallels the proposed alignment of Oak Street between North 19th and North 17th Avenues. In conjunction with the canal, several headgates and flow distribution structures are in place to adjust flows and serve adjacent feeder canals.

The MDHES classifies the water as "B-1". (A definition of this classification is contained in the glossary.) The quality of the water in the Farmers Canal is documented in a stormwater study performed by Thomas, Dean and Hoskins, Inc.[5] Total suspended solids, coliforms, nitrogen, and phosphorous concentrations all increase as the canal proceeds northward. Coliform organisms, oil and grease, ammonia nitrogen, and total phosphorous periodically exceed EPA Interim Primary Drinking Water Standards as well as MDHES water quality guidelines. Nitrogen and phosphorous forms undoubtedly receive some contribution from agricultural fertilizer sources. The canal presently receives stormwater runoff from adjacent urban areas including

[5] "Stormwater Master Plan for the City of Bozeman, Mt.", Thomas, Dean & Hoskins, Inc., 1982.

curbside inlets along the previously constructed section of North 19th Avenue south of Durston Road.

Photo 3
The Farmers Canal parallels the proposed alignment of North 19th Avenue from Durston Road to Oak Street. The previous project on North 19th Avenue replaced the open canal with a piped, underground conduit.

5) MIDDLE CREEK IRRIGATION DITCH

The Middle Creek Ditch, which is similar in size and flow characteristics to the Farmers Canal, crosses Kagy Boulevard just east of the eastern project terminus. The Middle Creek Ditch diverts irrigation water from Middle Creek southwest of Bozeman and ferries it along the southern edge of the city before re-entering Bozeman Creek at the southwest corner of the metropolitan area (see Figure 7).

While data is not available for chemical water quality in the Middle Creek Ditch, it is likely similar to the Farmers Canal recognizing its similar source, use, and local development. Flow in the ditch is seasonal, and a number of peripheral feeder canals with headgates and hydraulic structures exist along its length. A suitable conveyance structure for the ditch is already in place beneath the recently reconstructed portion of Kagy Boulevard and should remain unaffected by the proposed project.

b. Groundwater

The project corridors are underlain by alluvial groundwater at shallow to moderate depths. Alluvial fans and outwash from the canyon mouths south and east of the project area are the primary source of the aquifer material. Interbedded lenses of silt influence groundwater distribution and circulation.

Area groundwater levels are significantly influenced by seasonal irrigation and fluctuate between 20 or more feet during non-irrigation items to less than ten feet during periods of widespread irrigation.[6] Groundwater depths along the Kagy Boulevard corridor tend toward the deeper end of this range. Localized topography lends some variation to the depth of

[6] "Wastewater Facility Plan for the City of Bozeman, Mt.", Thomas, Dean & Hoskins, Inc., 1980.

groundwater occurrence; however, absolute groundwater table elevations are relatively uniform.

Municipal water is distributed to water users along the project corridors with the exception of the American Simmental Association, Baxter Lane Subdivision, and Smith and Boylan farmsteads where private wells exist. Other active potable water well uses do not exist immediately adjacent the project corridors.

Area groundwater is typically of low to moderate hardness and total dissolved solids, low iron and manganese content, and generally contains limited natural fluoridation.[7] Isolated occurrences of elevated nitrate concentrations are recorded, perhaps due to septic system malfunction. The low hardness and general groundwater quality suggest considerable recharge from the peripheral canyons and streams as would be expected in this alluvial aquifer situation.

[7] MOHES "STORET" computer file data retrieval August 26, 1985.

Because of groundwater considerations, the area could be sensitive for septic tank drainfield construction. Given the availability of central sewage collection, such construction is restricted within the corporate limits.

c. Sanitary Sewers, Water Mains, and Storm Drainage

The City of Bozeman maintains several underground pipe utilities for the transport of water or wastewater within both the North 19th Avenue - Oak Street and Kagy Boulevard project areas. Since much of the area adjacent to the proposed alignment of North 19th Avenue and Oak Street is used as farmland, city services have been extended only to those areas annexed by the city and developed for residential purposes. Likewise, areas along Kagy Boulevard to the west of South 11th Avenue typically lack city services. Since numerous development proposals exist for lands adjacent to the project areas, annexations and extensions of city services to serve the developments are likely.

The City of Bozeman's sewage needs are fulfilled by a system of trunk sewer lines which are connected to the city's sewer treatment plant. The plant, located northwest of Bozeman, was expanded in 1983-84 and should be adequate to serve a year 2000 population of 36,000.[8] Several major sewer lines existed in the North 19th Avenue - Oak Street area including 15-inch lines located along Durston Road and North 17th Avenue and a 24-inch interceptor sewer, located midway between North Seventh and North 19th Avenue. This line extends from Durston Road northward to the proposed Oak Street alignment and continues to North 19th Avenue, Baxter Lane, and ultimately to the wastewater treatment plant. The Baxter Lane interceptor and the Far West Trunk are wastewater system improvements designed to accommodate growth north and west of Bozeman.[9]

[8] "Bozeman Area Master Plan", Bozeman City-County Planning Board, 1985, p 3-25.

[9] "Bozeman Area Master Plan" p. 4-10.

Bozeman's water supply is taken from several sources, including: Lyman Creek, located northeast of the city; and Hyalite and Bozeman Creeks, located south of Bozeman. The Lyman Creek distribution reservoir has fluoridation and chlorination

treatment facilities. The Hyalite and Bozeman Creek sources also have full scale water treatment facilities since the completion of a water treatment plant with filtration and chlorination facilities in 1984. A ten-inch water line runs east-west along Durston Road and serves residential developments in the North 19th Avenue - Oak Street area. A water main that parallels the west side of North Seventh Avenue serves the residential and commercial developments at the east end of the Oak Street corridor. Along Kagy Boulevard, a six-inch water line provides service from South Third to South 11th Avenues. A new eight-inch water line was recently installed between South 11th Avenue and Willow Way to serve a new apartment complex near the university.

No storm drainage facilities exist along the proposed alignment of North 19th Avenue and Oak Street, although such facilities do exist in subdivisions located adjacent to the project area. An existing 15-inch storm drainage line is located along Blackmore Place just east of North 19th Avenue and a 12-inch line is located in the Royal Vista Subdivision near the intersection of Oak Street and North Seventh Avenue. Recent improvements to North 19th Avenue included the installation of storm drainage facilities between Babcock Street and Durston Road, the beginning of Project M1299(1).

The Stormwater Master Plan for Bozeman identified two locations near the North 19th Avenue - Oak Street project area for the construction of stormwater detention ponds.[10] The first, and largest of the two areas, is a site located south of the proposed Oak Street alignment and adjacent to the west edge of the Royal Vista Subdivision. The plan calls for a 310,000 c.f. detention pond designed for a ten-year storm frequency. A second detention pond is planned for an area to the north and west of the intersection of North 19th Avenue and Oak Street. This facility would have a capacity of approximately 90,000 c.f. and be designed for a five-year storm frequency. The smaller facility will be located in the recently annexed Annie Subdivision, and the developer will be required to handle stormwater as per the Master Plan. Construction of the detention ponds will be completed as funding allows and will ultimately improve water quality and reduce the hazard of downstream flooding.

[10] "Stormwater Master Plan", Thomas, Dean & Hoskins, Inc., 1980, Plate 2-7.

Storm drainage facilities along Kagy Boulevard between South Third and South 11th Avenues are primarily located at major intersections. The most recent Kagy Boulevard improvement project [M1212(1)], resulted in the installation of inlets, ditches and 18-inch storm drainage piping at the intersection of Kagy Boulevard and South Third Avenue. Additional facilities exist near the Kagy Boulevard - Greek Way intersection and along the south edge of the MSU campus. Piping ranging from 18 to 21 inches and storm drainage inlets are located along Kagy Boulevard between Reno H. Sales Stadium and South 11th Avenue. Shallow, open ditches are adjacent to Kagy Boulevard between Willow Way and South 19th Avenue. Storm drainage facilities (ditches and piped conduits) generally drain to the north and east toward the Middle Creek Ditch and Bozeman Creek (see Figure 7).

d. Floodplains

Based on maps of flood hazard areas for the City of Bozeman and Gallatin County prepared by the Federal Emergency Management Agency (FEMA), it was determined that none of the project areas lie within identified 100-year floodplains of the East Gallatin River or local creeks.[11] These maps, which were prepared for communities participating in the National Flood Insurance Program, identify the study areas as "Zone C" denoting areas above the designated floodplains. As participants in the program, both Gallatin County and the City of Bozeman have adopted floodplain management regulations in the interest of public safety. Although the floodplains of the drainages that cross the proposed roadway alignments are not delineated under the flood insurance program, they are important to the immediate project area and should be considered in the design of all facilities.

[11] Federal Emergency Management Agency, Federal Insurance Administration, Flood Hazard Areas for Gallatin County. (maps)

4. Air Quality

a. Dispersion Meteorology

The City of Bozeman is located near the eastern edge of the Gallatin Valley at an elevation of approximately 4,800 feet above sea level. The floor of the Gallatin Valley and the adjacent mountain ranges form a natural "bowl." In addition to topography, several other factors influence the air pollution dispersion potential of an area including: wind speed and direction, atmospheric stability, humidity, barometric pressure, the mixing depth of the wind, precipitation, and temperature.

Under certain meteorological conditions, the air becomes extremely stable and the dispersion of pollutants from the Gallatin Valley is extremely limited. This condition is known as an inversion. Pollutants released during inversion will be trapped and concentrated within the layer of stable air. An inversion layer that occurs at or near the surface will concentrate pollutants in the layer below or near the source areas. This phenomenon frequently occurs during fall and winter months and is accentuated by the confinement created by surrounding mountains, which shelter the valley from the wind and allow cold air to drain into the valley at night.

b. Emission Sources

The major sources of total suspended particulates in the immediate Bozeman area are particles generated by residential wood burning, fugitive dust generated along unpaved roads, and re-entrained dust from along paved roads during snow-free periods. Other sources of TSP in the Bozeman area include agricultural activities, wind erosion, gravel crushers, asphalt plants, and automobiles. Carbon monoxide is the by-product of the incomplete combustion of organic fuels. The primary sources of carbon monoxide are automobiles and residential wood burning during the winter months.

c. Ambient Air Quality

Standards for the evaluation of air pollution levels have been adopted by both the federal and state governments. Federal standards are divided into primary standards, which when exceeded may have adverse effects on human health and secondary standards, which when exceeded may result in health or property damage. The Montana standard and federal primary standard for a 24-hour average of TSP reading are 200 ug/m^3 (micrograms pollutant per cubic meter of sampled air) and 260 ug/m^3, respectively. The federal 24-hour secondary standard for TSP is 150 ug/m^3. The Montana TSP standard for an annual average is 75 ug/m^3. Federal primary and secondary standards for TSP include an annual geometric mean of 75 ug/m^3 and 60 ug/m^3, respectively. It should be noted that the Montana annual standard for TSP is an arithmetical average, not a geometric mean as employed in the federal standards. All short-term standards are not to be exceeded more than once per year.

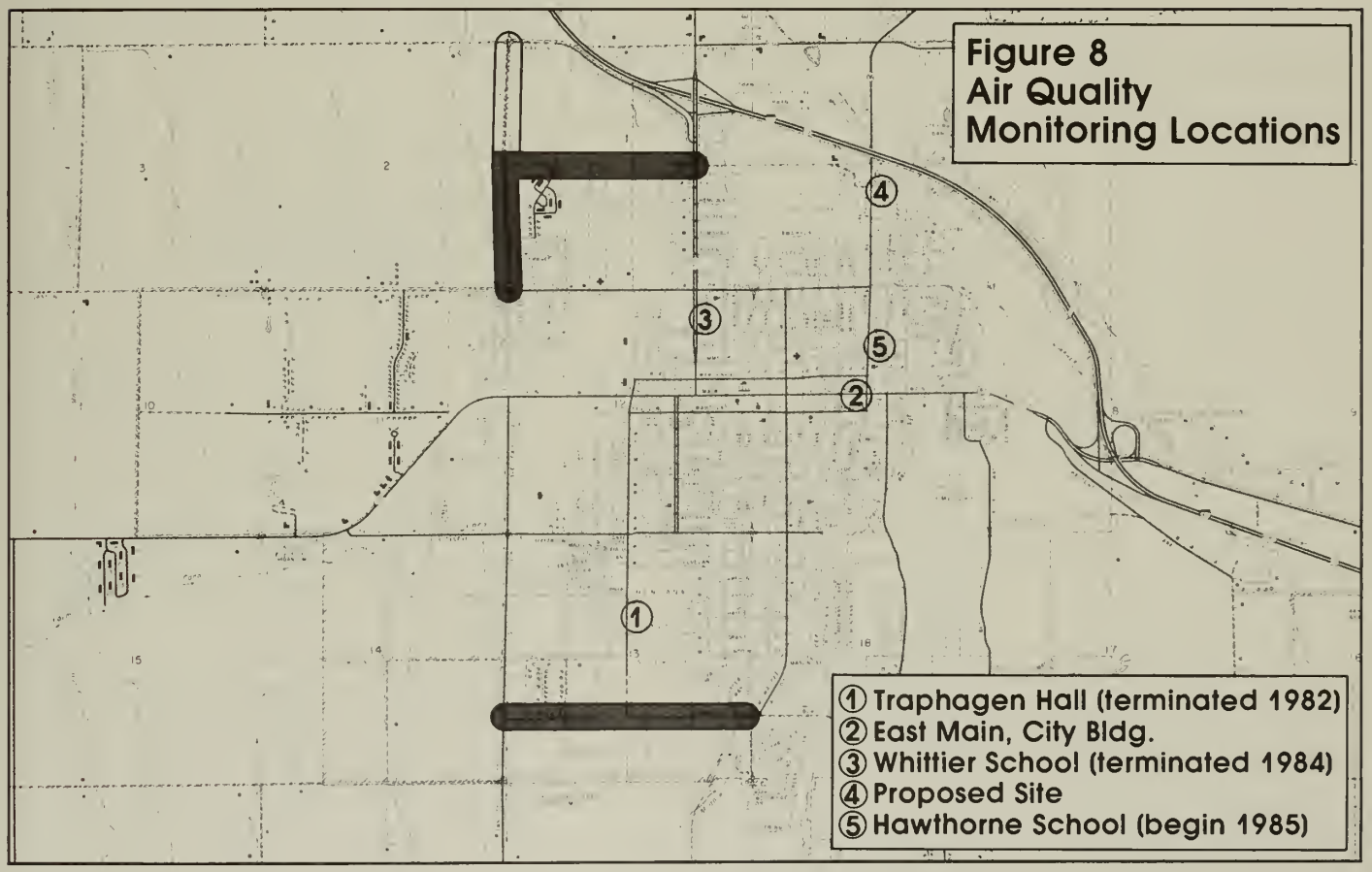


Figure 8 depicts the locations of past and present air quality monitoring sites in Bozeman. Table No. 2 contains a summary of the TSP monitoring conducted at these sites for the period from 1982-1984. The City of Bozeman, with the assistance of the State Air Quality Bureau, recently established another TSP monitoring site at the Hawthorne School on Rouse Avenue and Mendenhall Street. Volunteers will take daily TSP readings to help determine the effects of residential wood burning on local air quality.

In order to determine the relationship between air pollution and meteorology so ambient air pollution concentrations may be described or predicted, both air quality and meteorological conditions have been monitored at various locations in Bozeman and the Gallatin Valley. The Montana Department of Health and Environmental Sciences, Air Quality Bureau and the Gallatin County Health Department, in a cooperative agreement, maintain the primary sampling site at the City Building on East Main Street. This site monitors only total suspended particulates (TSP). Other TSP monitoring sites utilized in the past include: Whittier School, located east of the intersection of Durston Road and North Seventh Avenue, and Traphagen Hall located on the MSU campus. Due to the expense and manpower of maintaining these latter two monitoring sites, sampling has since been terminated. The Whittier School sampling site was established in 1982 to monitor residential wood burning impacts; however, sampling was terminated at the end of 1984 because TSP levels were well below federal primary and secondary standards. In its place, the Air Quality Bureau proposed to monitor a site in northeast Bozeman where unpaved roads have caused fugitive dust problems.[12]

[12] "Montana Air Quality Data and Information Summary for 1984", MDHES Air Quality Bureau, July, 1985.

Table No. 2

Total Suspended Particulates (TSP)
(Micrograms per Cubic Meter)

BOZEMAN AIR QUALITY MONITORING SITES

Site	Num. Obs.	Max. Obs.	2nd Max.	3rd Max.	Arith. Mean	Geom. Mean
East Main City Building						
1982	52	265	180	148	67.4	56.6
1983	46	137	136	127	67.7	59.1
1984	30	198	179	174	81.1	68.8
Whittier School						
1982	56	143	125	124	52.9	47.3
1983	56	118	114	107	52.6	47.2
1984	45	202	157	152	67.4	57.1

Source: Montana Air Quality Data and Information Summary for 1984, MDHES Air Quality Bureau, July 1985.

To date, no air quality monitoring has been done in the Bozeman area with respect to carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2) or oxidants (ozone).

Monitoring conducted by the Gallatin County Health Department and the Montana Air Quality Bureau at the East Main City Building in 1982 indicated that the federal 24-hour primary

standard was exceeded only once during the year. Both the East Main City Building and Whittier School sites exceeded the 24-hour federal secondary standard of 150 ug/m^3 during the year.[13] In 1983, the federal and state annual standards for TSP were not exceeded at either monitoring location. The monitoring site at Traphagen Hall on the MSU campus, while still in operation, showed low TSP concentrations and was well below federal and state standards. In 1984, the federal secondary and state annual standards for TSP were exceeded at the East Main City Building site.

13 "Montana 1983 Network Review", MDHES Air Quality Bureau, September 1983, p. 73.

Amendments to the Clean Air Act in 1977 required that all areas within each state be classified with respect to the national ambient air quality standards. Areas which do not meet the specified air quality standards are designated as non-attainment areas. Areas that have ambient air quality levels better than the national standards or which cannot be classified on the basis of available information are referred to as attainment (or unclassified) areas. The Bozeman area is designated as unclassified for TSP, carbon monoxide, sulfur dioxide, oxidants, and nitrogen oxides. Since the area is designated as unclassified for a number of pollutants, Prevention of Significant Deterioration (PSD) requirements are applicable. These requirements set limits for increases in ambient pollution levels and established a system for preconstruction review of major new sources of pollution. The Bozeman area has been designated as a Class II area by these requirements, which allows for moderate, well planned growth and permits some decrease in ambient air quality.

5. Noise

a. Noise and Evaluation Standards

Although all transportation modes are sources of noise, highway traffic is the most common and readily apparent of the sources. The perception of highway noise depends on a number of factors including type, volume, and travel speed of vehicles; the nature of the area in which the noise occurs; the relationship between the vehicle and the roadway; and the distance from the roadway to the noise receptor. The transportation-related impacts of noise are most evident when evaluated with respect to accepted noise standards.

Noise measurements are basic to the use of any noise standard. The decibel (dB), a logarithmic measure of sound pressure, is the most widely accepted unit of noise measurement. The most frequently used measure of the magnitude of traffic noise is in units of dBA (the sound pressure levels in decibels measured with a frequency weighting network corresponding to the A-scale on the standard sound level meter). Extensive research developed the A-weighting scale, which simulates the hearing characteristics of the human ear by de-emphasizing low frequency noise components. Higher values are assigned to noise frequencies that are the most annoying to humans. Zero dBA represents the threshold of hearing, and 140 dBA is the threshold of pain on the A-weighting scale. The ear typically

perceives: a sound level change of 3 dBA as barely noticeable; a 6 dBA change as a significant increase; a 10 dBA change as twice as loud; and a 20 dBA change as very much louder.[14] Therefore, areas which experience an increase in noise levels of at least 10 dBA may be seriously impacted by the new traffic facilities.

[14] Fundamentals and Abatement of Highway Traffic Noise, Doc. 1 pp. 4 & 7; Doc. 2 pp. 72, 1D7, 125; Doc. 3 p. 10; Doc. 5 pp. 19, 20; US DOT, FHWA, September 1980.

The standard that will be used to evaluate traffic-related noise and potential impacts in the project areas is the FHWA noise abatement criteria. The FHWA standards are presented in terms of L_{10} noise levels (level of sound exceeded during ten percent of the analysis period) and are directly applicable to measured and predicted levels. The L_{10} standards consider not only absolute noise level changes but also that changes in noise levels may be of varying importance and dependent upon ambient noise levels and existing land uses. The FHWA noise abatement criteria for specific receptors and land use types are presented in the following table.

Table No. 3

Noise Abatement Criteria[15]

Design Noise Level (L_{10})		Description of Land Use Category
60 dBA (Exterior)	A)	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
70 dBA (Exterior)	B)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks
75 dBA (Exterior)	C)	Developed land properties for activities not included in Categories A and B above; i.e., commercial and industrial development
55 dBA (Interior)	D)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums

[15] Noise Standards and Procedures, PPM 90-2, US DOT, FHWA, February 1973 and "Noise Abatement Criteria", Federal Aid Highway Program Manual, Vol. 7, Chap. 7, Sec. 3, August 9, 1982.

Noise sensitive receptors within the North 19th Avenue - Oak Street and Kagy Boulevard areas are primarily limited to the residential areas located along portions of the proposed alignments. The Church of Christ, located north of Kagy Boulevard near its intersection with South 19th Avenue, must be considered as a noise sensitive location. Much of the vacant land west of North 19th Avenue and north of Oak Street is planned for future residential development.

b. Ambient Noise Levels

The three major components of highway noise are engine noise, exhaust noise, and tire noise. These are dependent on speed, acceleration, grade, and roadway condition. Engine and exhaust noise are the primary source of noise for vehicles at slower speeds, and tire/roadway interaction for vehicles at higher speeds. Large diesel trucks produce the loudest traffic noise. Traffic mix, i.e. the number of automobiles, medium trucks and heavy trucks, is important when measuring and predicting L_{10} noise levels, since each type of vehicle generates a different level of sound.[16]

[16] Fundamentals and Abatement of Highway Traffic Noise, US DOT, FHWA, September 1980.

Noise measurements were made at 22 locations along the arterial corridor comprised of Highland and Kagy Boulevards, 19th Avenue, and Oak Street. Measurements were made at these locations during August, 1985, using a microphone/tape recorder and a sound level meter. Figure 9 shows the location of the noise monitoring sites. The tests were performed over 15-minute periods throughout the day at various distances from the existing or proposed roadway centerlines. Traffic volumes and composition were also measured for the test period at locations adjacent to existing roadways. Recorded noise for each site was then analyzed with a noise level recorder and statistical distribution analyzer. The analysis of the noise measurements determined existing L_{10} noise levels for each project area.

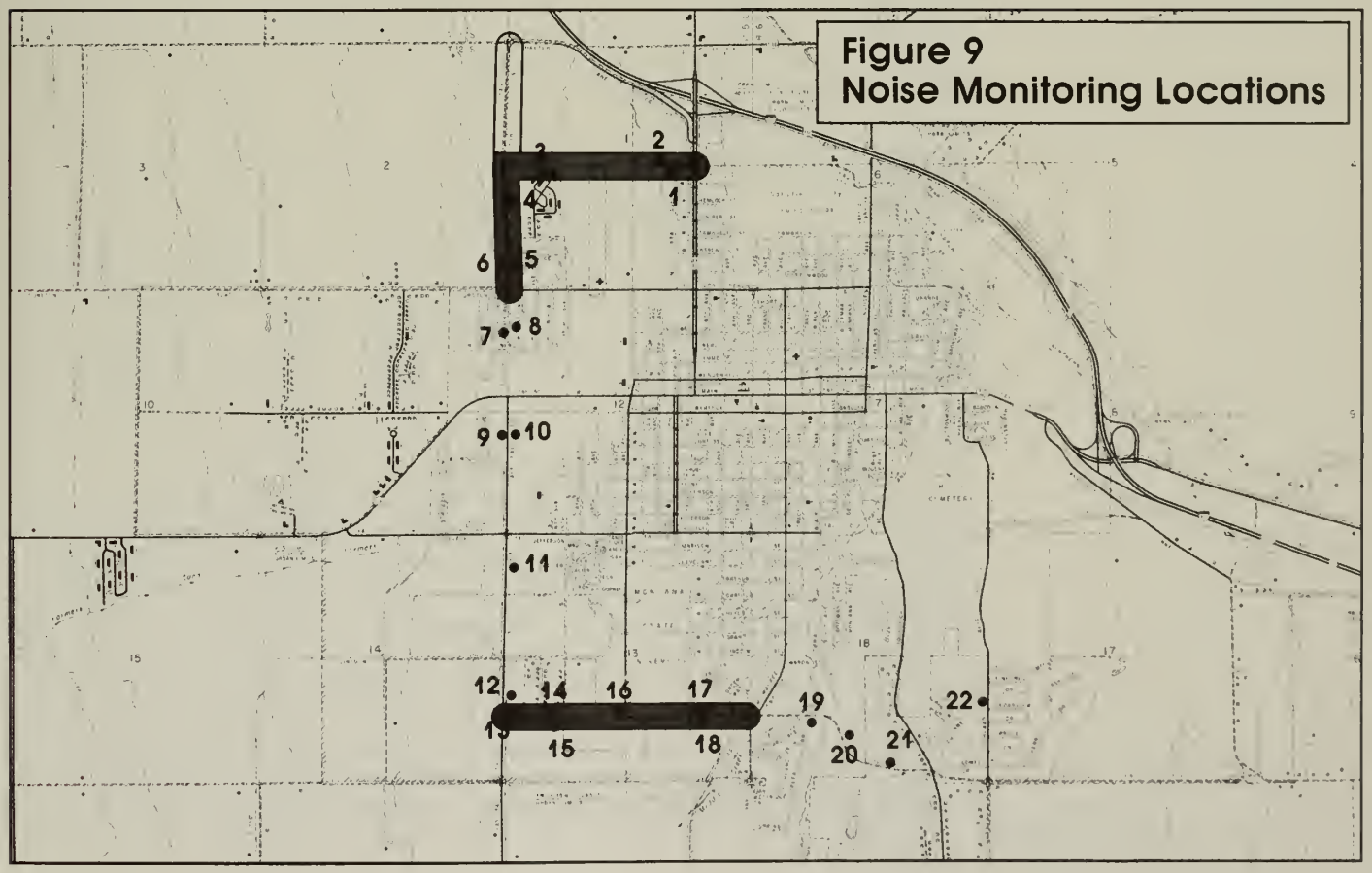


Figure 9
Noise Monitoring Locations

Predictions of the present noise levels were also made using the computerized FHWA Traffic Noise Prediction Model SNAP 1.0 (Simplified Noise Analysis Program). The model utilizes the existing conditions (i.e., distance from observer to source, traffic volume and composition average vehicle speed, etc.) to compute a predicted noise level.[17] A comparison of measured and predicted L_{10} noise levels is necessary to determine the accuracy of the prediction model. If the comparison indicates a close correlation between the values, the prediction of future noise levels should be quite accurate for the study areas. Table No. 4 shows the actual measured L_{10} noise levels and the SNAP 1.0 predictions of present L_{10} noise levels.

[17] "User's Manual: Highway Traffic Noise Prediction Model SNAP 1.0", US DOT, FHWA, RD-78-129, January 1979.

Table No. 4
Existing L_{10} Noise Levels

Site No.	Distance from Centerline	Measured L_{10} dBA Noise Level	SNAP 1.0 Prediction of Present L_{10} dBA Noise Levels
1	53'	54	*
2	64'	52	*
3	132'	53	*
4	110'	51	*
5	195'	50	*
6	50'	50	*
7	83'	63	61
8	84'	62	60
9	56'	65	61
10	78'	62	62
11	72'	63	61
12	88'	62	58
13	278' E/240' N	55	54
14	81'	50	*
15	125'	50	*
16	105' W/214' N	55	57
17	98'	58	57
18	424'	51	50
19	85'	55	56
20	63'	56	55
21	82'	55	53
22	65'	54	50

*Traffic volumes too low or non-existent; therefore, ambient noise levels were measured but no computer prediction made.

The measured and predicted noise levels shown in Table No. 4 indicate the correlation between the SNAP 1.0 computer predictions and actual noise measurements along the project corridors. A three to four dBA difference between the modeled noise levels and the measured noise levels is not judged to be a significant variation. It is evident from the data contained in the table that the variation between predicted and actual noise levels is within the acceptable range. Therefore, the FHWA noise prediction model is considered to be accurate for this study.

C. Biological Environment

1. Vegetation

Vegetation in the North 19th Avenue and Oak Street area is typical of most agricultural lands adjacent to Bozeman and consists of plowed or fallow cropland and pastureland. Ungrazed natural drainage ways support deciduous/riparian vegetation dominated by willow (Salix sp.) or aspen (Populus tremuloides). Grazed drainage ways and irrigation ditch banks support little riparian vegetation except grasses; including smooth brome (Bromus inermus) and rye grass (Agropyron sp.), and several weed species. The proposed alignment of Kagy Boulevard west of South 11th Avenue also passes through cultivated and pasturelands. Vegetation that may be affected by the proposed improvements of Kagy Boulevard include some stands of mature spruce (Picea sp.) and Cottonwood (Populus deltoides); a small cattail (Typha sp.) marsh fringed by a sedge (Carex sp.) meadow, located north of KXXL radio station; a variety of willow species; and snowberry (Symphoricarpos occidentalis) and gooseberry (Ribes sp.) shrubs. Plant species identified as being rare or having a limited distribution in Montana do not occur within either project corridor.[18]

[18] "Water Quality/Fisheries/Vegetation/Wildlife Studies", for Project Corridors, OEA Research, Helena, June 1985, p. 2.

2. Fish and Wildlife

Wildlife in the semi-urban areas of North 19th Avenue, Oak Street and Kagy Boulevard appears to be limited to birds and small mammals associated with agricultural land, deciduous riparian habitat, and cattail marsh. Birds observed in the riparian habitat along North 19th Avenue and Oak Street include the common snipe (Capela gallinago), red-winged blackbird (Aegelaius phoeniceus) and ruffed grouse (Bonasa umbellus). Birds observed in the cattail marsh along Kagy Boulevard include the common grackle (Quiscalus quiscula), song sparrow (Melospiza melodia), red-winged blackbird, and common snipe. Brown-headed cowbirds (Molothrus ater), magpies (Pica pica), crows (Coruus brachyrhynochos), and Brewer's blackbirds (Euphagus cyanocephalus) were observed in pasture and croplands located within both project corridors. Small mammals found in all project area locations may include deer mice (Permoyscus maniculatus) and voles (Microtus sp.).

The drainages crossed by the proposed improvement projects provide limited habitat for fish species. At the time of the field investigations, the westernmost of the two drainages crossed by a future Oak Street was dry. The eastern drainage was found to contain an abundant source of organisms that would provide an excellent source of food for trout. The drainage crossed by the proposed alignment of Kagy Boulevard also provides habitat for fish species. It is not known at this time if either perennial drainage is inhabited by fish species; however, the Montana Department of Fish, Wildlife and Parks (DFWP) believes that wild trout populations may exist in one or more drainages affected by the project.[19] The landowner

[19] OEA Research Studies, p. 1.

adjacent to the easternmost Oak Street drainage, in conjunction with the DFWP, has been working to improve habitat and ultimately plant brook trout in the water course.

3. Wetlands

A wetland area of approximately two acres in size is located north of the proposed alignment of Kagy Boulevard. Only a small portion of this wetland (40 feet by 240 feet or 0.22 acres) lies within the proposed 90-foot-wide right-of-way corridor for the roadway. The cattail marsh area is fringed by a sedge meadow and provides habitat for a variety of willow species. The marsh is fed by an intermittent drainage that carries runoff from the agricultural lands which lie to the south of the project area.

The wetland is not of sufficient size to provide prime feeding or nesting grounds for waterfowl. The area does serve as general habitat for birds and small non-game animals associated with riparian and seasonally wet terrain. The wetland area affected by the Kagy Boulevard improvement project does not have a significant role in pollution abatement or in local flood control due to its isolation from a major drainageway; however, the marshy area does have the capacity to retain some water. The Kagy Boulevard wetland, by virtue of its size and location, has limited recreational value.

D. Human Environment

1. Population

U.S. Bureau of the Census data for Gallatin County and the City of Bozeman indicates that both jurisdictions have grown at rates higher than state or national averages during recent years. Gallatin County's population increased by 31.9% from 1970 to 1980, while the City of Bozeman increased by 15.9% during the period. Perhaps the most notable growth figure is that the population in the jurisdictional area around Bozeman (including all lands within 3.5 miles of the city limits) increased by 62.2% during the 1970's. Population increases in the city and county are primarily attributable to immigration rather than a natural population increase. This in-migration is due to the favorable economic conditions in the Bozeman area and increased enrollments at Montana State University.

The Bozeman Area Master Plan provides the most recent estimates of population for Bozeman, the jurisdictional area, and Gallatin County. This document updated the 1980 Census data and contained population estimates for 1983 and 1985 for each political entity. Historic populations and current population estimates for Gallatin County and the Bozeman area are compiled in Table No. 5.

Table No. 5

Population and Population Projections for Bozeman Jurisdictional Area, and Gallatin County

	1970	1980	Percent Change	1983[20]	1985[20]
Bozeman	18,670	21,645	15.93%	22,457	23,809
Jurisdictional Area	3,380	5,483	62.20%	5,853	6,140
Gallatin County	32,505	42,865	31.90%	--	47,151

20 "Bozeman Area Master Plan", pp. 3-12 and 3-15.

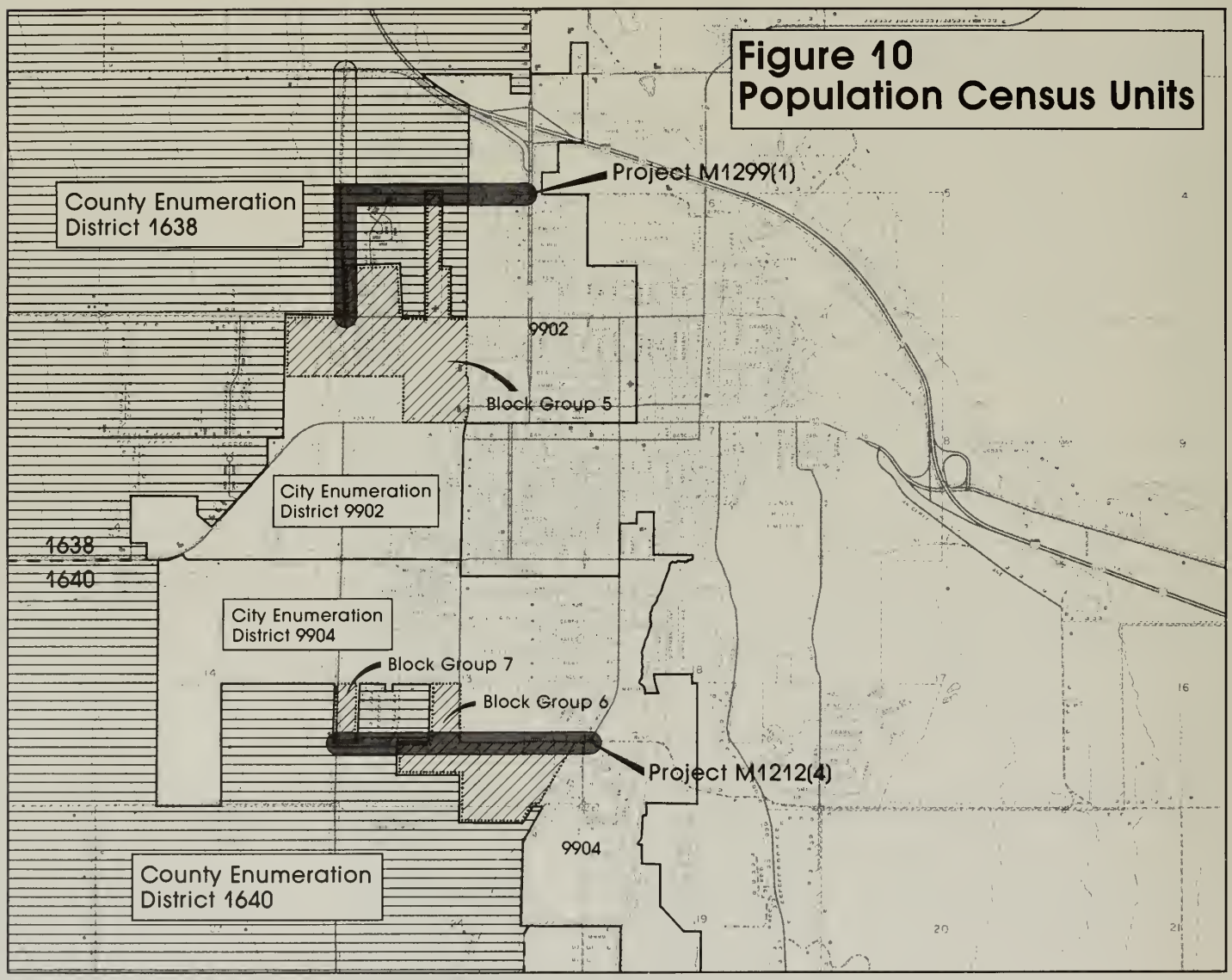
a. Project Area Population

The U.S. Department of Commerce, Bureau of the Census has divided the urban areas of Gallatin County into large enumeration districts and smaller block groups and block numbering areas for statistical purposes. Since the project corridors cross a number of these demographic units and many of the lands within each corridor are currently undeveloped, project area populations are difficult to allocate. Therefore, a one-quarter-mile-wide corridor bisected by the proposed roadway alignment was identified for each project area and used to determine a population estimate for the immediate project areas. The number of dwellings were identified from recent arterial photography, field verified and multiplied by current occupancy rates provided by the Bozeman City-County Planning Department. Approximately 100 dwelling units were identified within the North 19th Avenue - Oak Street project area. Based upon an average household occupancy rate of 2.4 persons for the city, it is estimated that 240 people reside within the immediate vicinity of the project. Six houses and the University Village Apartments account for 106 dwelling units in the Kagy Boulevard project area. Based on an average occupancy rate of 2.54 persons per household in the county and 2.4 for apartments in the city, it is estimated that 250 persons currently reside in the immediate Kagy Boulevard area.

Residential growth is expected to occur on the undeveloped lands zoned for residential use adjacent to the proposed projects. In fact, both project areas are mentioned as probable locations for growth in the Bozeman Area Master Plan. Therefore, because large residentially zoned vacant land areas are available and because development proposals are currently underway for at least one-half of the vacant acreage, population is expected to grow adjacent to the project corridors over the next five years. The rate of this development is contingent in part upon the roadways being built, the availability of other public services, and the local economy. It is difficult to predict the amount of growth that may occur in these vacant lands; however, it is likely that residential growth will exceed the areawide rate previously experienced since these lands will be the focus of future development.

b. Population Characteristics

The 1980 Census data provides an indication of income levels, age distribution, sex, race, and the number of persons with a physical disability in the neighborhoods which will be affected by the proposed projects. The analysis of demographic characteristics allows for special consideration of minority, low income or handicapped persons that might be impacted by the proposed action. These statistics are also indicative of pedestrian activity, automobile use, and alternate transportation modes. Figure 10 shows the project areas with respect to city and county census units.



Enumeration District 1638 and Enumeration District 9902, Block Group 5 are the census units which include the proposed alignment of North 19th Avenue and Oak Street. Enumeration District 9902, Block Group 5 includes the Blackmore Place - North 17th Avenue area north of Durston Road and east of 19th Avenue. Only four of the 1,136 people residing in the district were listed as minorities. No one within the district indicated a

transportation or work prohibitive disability. Three percent of the residents of the district walked to work and two percent carpooled. A group of elderly persons resides at the Gallatin County Rest Home located adjacent to Durston Road approximately one-half mile away from the proposed alignments of North 19th Avenue and Oak Street.

Enumeration District 1638 includes the county areas north and west of the proposed alignments of 19th Avenue and Oak Street. Since this area is not within the city, census data is available only at the greater County Enumeration District level. The most notable residential area in the district is the Covered Wagon Mobile Home Park located near the proposed intersection of North 19th Avenue and Oak Street. Household size in Enumeration District 1638 was determined to be 2.5 persons per dwelling. Census data did not identify any minorities or persons with disabilities for the 1,621 residents of the district. Less than one percent of the respondents indicated they walk to work, although the proximity of Bozeman High School suggests students in the area may walk to school.

The proposed alignment of Kagy Boulevard passes through County Enumeration District 1640 and City Enumeration District 9904, Block Groups 6 and 7. Enumeration District 9904, Block Groups 6 and 7 encompass residential areas within the city west and south of the University along Kagy Boulevard. This area contains a major apartment complex, the University Village Apartments; however census data for Block Group 6 does not reflect the number of residents in the area due to the recent construction and occupancy of the complex. Data for Block Group 6 indicated that 76 people lived in 52 dwelling units at the time of the census. This yielded a well below average household size of 1.5 persons per unit. Six minority persons were identified within the area and no respondents listed a work or transportation disability. Twenty-nine percent of the residents stated they walked to work and 19% indicated they carpooled. It is likely that the occupancy rate and the percentage of residents that walk to work or school is significantly higher with the addition of a large group of students residing at the University Village Apartments.

Block Group 7 exhibited demographic characteristics similar to those in Block Group 6. A total of 184 persons lived in 104 households in this area near the west end of the Kagy Boulevard project area. The occupancy rate for this area was 1.76 persons per dwelling unit, well below the average for the City of Bozeman. No one was identified as having a work-related or transportation disability. Seventeen percent of the respondents walked to work, and nine percent of the residents indicated that they carpooled.

Enumeration District 1640 includes a large unincorporated area adjacent to the southwestern portion of the city. The northernmost portion of the district includes the Willow Way and Alder Court residential area located just north of Kagy Boulevard. Data for this county district may be less indicative than Block Group data since the district includes a much larger geographic area. Enumeration District 1640 had a population

of 678 persons in 1979 and contained no minorities. Household size was somewhat larger than the city block groups at 2.5 persons per dwelling unit. Only two percent of the respondents walked to work or carpooled.

2. Housing Characteristics

The total number of housing units has increased with population growth in Gallatin County and the Bozeman area during recent years; however, the number of housing units increased at a much more rapid rate than the city or county populations. From 1970 to 1980, the City of Bozeman experienced an increase in population of almost 16% and a 39% increase in housing units. Housing unit increases for Gallatin County and the jurisdictional area of Bozeman were 62.2% and 101%, respectively. These figures suggest that not only the greatest rate growth has taken place within the outskirts of Bozeman but also household size decreased over the period.

While single-family houses are the predominant housing type, both multi-family and mobile home development increased between 1970 and 1980. Development proposals for vacant lands adjacent to both the North 19th Avenue - Oak Street and Kagy Boulevard project areas include provisions for multi-family, modular, and mobile homes.

Housing counts taken from recent aerial photography indicate approximately 100 units are located within the project corridor for North 19th Avenue - Oak Street. The predominant housing type within the corridor is the mobile home, due to the location of the relatively densely developed Covered Wagon Mobile Home Park along 19th Avenue and Oak Street. According to the Bozeman Area Master Plan and current zoning and development proposals, it is likely residential uses along the corridor will increase and consist of medium to high density housing including modular, mobile, single-family detached, and multi-family units.

Photo 4
The University Village apartments, located southwest of the Kagy Boulevard - South 11th Avenue intersection and adjacent to MSU, accounts for most of the housing units in the Kagy Boulevard project area.

One large multi-family structure, the University Village Apartments, is located near the Kagy Boulevard - South 11th

Avenue intersection. The remainder of the housing being conventional single-family houses. Addition of 56 units at the University Village Apartment has been approved, but construction is contingent upon the improvement of Kagy and water line improvements. Montana State University has just completed construction of 90 new married student housing units and has razed approximately 50 units for a net gain of approximately 40 units.[21]

[21] Steve Lere, Planning Director, Bozeman City-County Planning Board, in personal communications February 13, and 20, 1985.

Areawide, the demand for conventional single-family dwellings is expected to grow in the near future, while the demand for other types of housing has been satisfied and is expected to taper off.[22] According to a local realtor, there are currently more apartments for rent in the Bozeman area than there have ever been. In general, the housing market has slowed over the past two years and is expected to remain so until interest rates are lowered.[23] The 1980 vacancy rates for Gallatin County were 14.6% while Bozeman and its jurisdictional area were 7.1% and 7.9%, respectively.[24] The current vacancy rates are estimated to be 1.5% for sale units and 7% for rental units in the Bozeman area.[25] In the North 19th Avenue - Oak Street area, 41% of the total housing units in Enumeration District 9902, Block Group 5 were renter occupied. Nearly three-fourths of the housing units in County Enumeration District 1638 were renter occupied. Renter-occupied housing also predominates the Kagy Boulevard area near the University. Only five percent of the housing units in Enumeration District 9904, Block Groups 6 and 7 were owner-occupied in 1980. More than half of the housing units in County Enumeration District 1640 were owner-occupied.

[22] Lere, pers. comm. February 13 and 20, 1985.

[23] Gene Cook, realtor, Cook-Bell Realty, in a personal communication February 25, 1985.

[24] "Bozeman Area Master Plan", p. 3-16.

[25] Lere, pers. comm. February 13, 1985.

a. Property Values and Sales

Three realtors were interviewed and the current "Homeseekers" guide, a publication containing local real estate listings, was examined to obtain data regarding property values along the project corridor and to determine the availability of similar housing or property for any residents or business relocated by the project. In addition, assessed values (now called "market values") were gathered for all properties fronting either project from the Gallatin County Assessor's Office. According to these sources, a property one-third to one-half acre in size and zoned for high density residential and/or commercial is selling for approximately $20,000. Medium to high density residential property is selling for $7,000 to $13,000 per acre plus SID assessments.[26] Prices for single-family conventional homes in the Blackmore - 17th area are estimated to range from $55,000 to $80,000.[27] U.S. Bureau of Census figures for owner-occupied units in this area of Bozeman indicated a similar range of estimates. There were no estimates available for housing in other areas. Typical rents varied from $100 to $500 per month within both project areas.

[26] Mary Ackerman, realtor, Cook-Bell Realty in a personal communication February 25, 1985.

[27] Cook, pers. comm. February 25, 1985.

The availability of rental units and houses for sale is currently excellent.[28] According to the latest issue of the Multiple Listing Service publication, Homeseekers, there is housing available ranging in price from $30,000 to in excess of $100,000 in a variety of locations in and around Bozeman.[29]

[28] Cook, pers. comm. February 25, 1985.

[29] "Homeseekers", Multiple Listing Service, Vol. 12, No. 3, March 1985.

None of the realtors had seen any evidence to date that property values had been significantly affected, either positively or negatively, by the Kagy improvement project east of South Third Street. They concurred that the improvements might facilitate growth in the area but not affect property values to any great degree.

3. Land Ownership and Land Use

a. Land Ownership

The majority of land within each of the project corridors is privately owned. The significant exceptions include public ownership of the MSU campus bordering Kagy Boulevard; three quasi-public church ownerships along Kagy; City of Bozeman properties at the northeast corner of North 19th Avenue and Durston Road and North Ninth Avenue Park; and the Gallatin County Rest Home property bordering the proposed Oak Street alignment.

b. Current Land Use

Land uses east of North 19th Avenue and between Durston Road and Oak Street are primarily residential although some small businesses, quasi-public buildings, agricultural and rural vacant land are also evident east of 17th Avenue and west of North Seventh Avenue. Property along North Seventh Avenue has been developed almost exclusively for business/commercial uses. Properties to the north of Oak Street and west of North 19th Avenue are currently in agricultural use.

Land uses along Kagy Boulevard, between South Third and South 11th Avenues, are public and quasi-public, primarily consisting of the Montana State University campus. Uses are primarily single-family residential between South 11th Avenue and South 19th Avenue; however, the University Village Apartment complex, church properties, and a small commercial area catering to MSU students are also located in this area. Lands to the south of Kagy Boulevard and west of South 11th Avenue are vacant or used agriculturally, with the excepton of a radio station and a farmhouse and attendant buildings.

Both the North 19th Avenue - Oak Street and Kagy Boulevard areas contain vacant lands zoned for more intensive uses. Coupled with development plans discussed below, it is safe to say that land use trends along both project areas are towards denser residential uses.

c. Future Land Use

The Bozeman City-County Planning Director was interviewed regarding approved or proposed developments in order to ascertain future land uses. Those proposals that have been approved will obviously develop, but the rate of development will be dependent in all cases upon the timing of the proposed road

improvements and, in some cases, on the extension of additional public services. Discussion of the proposed developments should be regarded more tentatively. These proposed projects have been included to provide an indication of potential land uses in the project areas; however, implementation is subject to economic conditions and market demands.

Approved uses include the Annie Subdivision, a 243-acre annexation of the property which lies directly west of North 19th Avenue and between Durston Road and Oak Street. The Annie Subdivision is a phased proposal to develop the parcel with a mobile home park, apartments, and residential/office buildings. The property surrounds a ten-acre school site to be served by local streets and a multi-acre park site fronting on Oak Street. A similar multi-use development is proposed directly north of this property and adjacent to Baxter Lane. In addition, two proposals have been initiated to develop 140 acres of land which lies directly north of Oak Street and east of North 19th Avenue with residential and commercial uses. Since much of the land adjacent to the North 19th Avenue - Oak Street corridor is currently undeveloped and under large single ownerships, it is timely and desirable to establish access controls for these lands. The limitation of access to those locations viewed as desirable by the City of Bozeman and the Department of Highways will ensure that the future street network will function effectively and adjacent properties will be developed in a manner consistent with the intent of comprehensive planning for the area. The 140-acre parcel was annexed by the City of Bozeman in February, 1986. Developers of this property have promised to donate land for right-of-way on Oak Street and an extension of North 19th Avenue from Oak Street to Baxter Lane.

Development plans for the Kagy Boulevard area include the construction of a 56-unit addition to the University Village Apartments. Additionally, there are four parcels zoned for multi-family housing directly south of Kagy Boulevard and South 11th Avenue that are likely to develop when roadway and utility improvements are completed. A 100-acre technology park, known as Advanced Technology Center, is currently being developed at the southwest corner of College Street and South 19th Avenue. A series of contemplated campus improvements, road closures, and realignments will directly affect the use of Kagy and other roads surrounding the campus. These proposed improvements will be discussed in subsequent sections of this part.

Highland Boulevard, located east of the Kagy project area, was recently upgraded by the City through the use of SID's to provide a serviceable arterial route on the east side of the city. This route will provide access to the newly constructed community hospital near the intersection of Highland Boulevard and Ellis Street.

d. Agricultural Land Use

Several parcels to the south and a major portion of the lands directly north of the proposed alignment of Oak Street are

currently in agricultural use, either as crop or pasture land. The property to the south and east of the intersection of Kagy Boulevard and South 19th Avenue is also used agriculturally. The Federal Farmlands Protection Policy Act requires that impacts be determined and appropriate mitigation be proposed when a federally-funded project may convert potentially prime or unique agricultural lands or farmlands of statewide or local importance. The SCS was contacted to determine the agricultural viability of these properties based not only on soil capability but other social, economic, and environmental factors. The District Conservationist determined that, even though the soils in each project area are utilized as farmland and possess qualities of other prime and unique soils in the Bozeman area, economic factors, the proximity to the urban area, and planned developments limit the continued agricultural use of some lands adjacent to the projects.

Photo 5
Westerly view along the proposed alignment of Oak Street. Development proposals exist for the agricultural lands to the right of the fenceline shown in the center of the photograph. Note the location of Covered Wagon Mobile Home Park.

The Bozeman Area Master Plan recognizes the importance of agricultural land and has assessed the impact of overall development in the Bozeman area on the local agricultural resource. According to the Plan:

> The total land area likely to be taken out of agricultural use and developed over the next 20 years will have little effect on agricultural production because it is not likely it will total more than 1,000 to 1,200 acres in the jurisdictional area. However, several thousand acres are likely to have the agricultural use potential eliminated or severely impacted as a result of speculative subdivision activity, scattered subdivisions, and dispersed developments . . .[30]

[30] "Bozeman Area Master Plan", p. 3-29.

The intent of local planning and zoning has been set, in part, to concentrate development within the 1.0 mile sewer service area where density of development is greater and services are more readily available as a means of lessening the impacts on agriculture elsewhere in the Gallatin Valley. All lands along

the project segments are within the City of Bozeman's jurisdictional area.

e. Comprehensive Planning

The 1983 Bozeman Area Master Plan was prepared to provide a set of goals and recommendations as to how the City and its surrounding area should grow. All lands within the North 19th Avenue - Oak Street and Kagy Boulevard project areas are covered by this plan. Lands adjacent to the proposed alignment of North 19th Avenue and Oak Street have been designated as suitable for medium density residential and/or multiple use development with the exception of publicly-owned lands and commercial areas along North Seventh Avenue. All private land along Kagy Boulevard adjacent to the north side of the roadway is designated as medium density residential and the MSU campus is designated as public land. Private lands to the south of Kagy Boulevard have been designated for multiple uses and medium density to low density residential uses. The proposed actions are consistent with transportation planning goals of the Master Plan and are, in fact, identified as high priority projects.

Montana State University has also prepared a Master Plan for Campus Development in which proposals for campus improvements are discussed.[31] Based on this document and conversation with MSU administrators, a number of campus development plans may affect or be affected by the proposed road improvements on Kagy Boulevard between South Third and South 19th Avenues. These development plans are summarized below.[32]

[31] "MSU Master Plan for Campus Development", pp. 22-30.

[32] Craig Roloff, Director of Administrative Services, MSU, in a personal communication February 20, 1985.

- MSU has made a general commitment to create a pedestrian-oriented campus through the closure of several through streets and the provision of perimeter network of arterial roads. Interior campus circulation would be provided by pedestrian malls and service drives. This move would result in the eventual closures of 11th Avenue, College Avenue, and Seventh Avenue within the campus and the conversion of these streets to pedestrian malls. The Museum of the Rockies will be expanded in the near future and would ultimately be served by a southern extension of Greek Way.

- MSU's proposal to enlarge the Engineering Building at the corner of Grant and Seventh Avenue would substantially alter this portion of the campus. The 1985 Legislature did not authorize funding for the project; however, a funding proposal will again be prepared for the 1987 legislative session.[33]

[33] Roloff, pers. comm. February 20, 1985.

- Establishment of a permanent access to the high tech firm located adjacent to the southeast corner of the campus. This action would result in closure of the firm's access at South Seventh Avenue and Kagy Boulevard and would require that alternate access be provided from an extension of South 11th Avenue, south of the stadium and track complex.

- Additional paving of the Fieldhouse parking lot is a long-term campus improvement.

- A strip of boulevard trees has recently been planted along the north side of Kagy between Seventh and 11th Avenues. These trees were planted with the knowledge that additional right-of-way for Kagy Boulevard exists to the south of the existing roadway.

Two other considerations supported by the University are pedestrian and bikeway improvements along Kagy Boulevard and the implementation of temporary traffic control measures to facilitate special events traffic departing from parking areas near Reno H. Sales Stadium or the Fieldhouse.

f. Zoning

Zoning designations are either currently consistent with the land use designations or are contemplated to be so within the next five years. Notable exceptions are lands within AS (Agricultural-Suburban) zoning designations located to the west of North 19th Avenue and north of Oak Street and south of Kagy Boulevard and east of South 19th Avenue. The AS lands near North 19th Avenue and Oak Street have been designated as suitable for medium density residential development by the land use plan. AS lands adjacent to Kagy Boulevard were designated for multiple use development by the plan. Annexations of properties along North 19th Avenue and Oak Street would probably be designated as RMH, permitting residential and mobile home development; RO, permitting residential and professional offices; or or R-4 zones, permitting low to medium density residential development consistent with Bozeman Area Master Plan.[34]

[34] Lere, pers. comm. February 13, and 20, 1985.

4. Community Infrastructure and Lifestyle

The study area is partially within the unincorporated area of the county and partially within the City of Bozeman's jurisdiction. Services that could be affected by the project and are provided by either of these jurisdictions are discussed in the following narrative.

a. Schools

The Bozeman Public School District owns three undeveloped school sites near the North 19th Avenue - Oak Street and Kagy Boulevard project areas. These include: a ten-acre site located approximately one-quarter mile west of North 19th Avenue; a parcel one-quarter mile east of the Kagy Boulevard project area on South Black Avenue, currently used as a park and baseball field; and a third site about one mile south of Kagy Boulevard on South Third Avenue.

Total enrollment in the Bozeman Public Schools has remained constant over the last decade.[35] According to District personnel, enrollments will probably remain relatively stable over the next decade. There are no immediate plans to develop any of the available school sites near the project areas. The

[35] "Volume III. Summary of the Final Report", Bozeman Public School System, February, 1981.

primary concern of the administration of the Bozeman Public Schools is that the proposed projects provide safe bicycle and pedestrian access since they may ultimately serve any of these three potential school sites.

b. Law Enforcement

Since the proposed road segments are located within both the city and county, law enforcement would be provided by both the Gallatin County Sheriff's Department and the City of Bozeman police force.[36] The primary concerns of these agencies regarding the proposed projects would involve traffic safety.

[36] Jim Wysocki, Manager, City of Bozeman, in a personal communication February 27, 1985.

c. Emergency Services

Fire protection to property in the city is provided by the Bozeman Fire Department. Lands within the county are protected by a rural fire district. Any fire where jurisdiction is questionable would be responded to by both agencies since mutual assistance agreements already exist.[37] The primary concern of fire districts would be access and response times, which should be improved by the proposed projects. Emergency medical service is provided 24 hours per day by Hall's Ambulance Service.

[37] Wysocki, pers. comm. February 27, 1985.

d. Utilities

The City of Bozeman and several private companies maintain utility distribution and service lines within the North 19th Avenue - Oak Street and Kagy Boulevard project areas. A 24-inch interceptor sewer line maintained by the city parallels Oak Street from North Seventh Avenue to North 19th Avenue and then turns northward to Baxter Lane and the municipal wastewater treatment plant near the East Gallatin River. The Montana Power Company maintains a 115 KV, three-phase overhead power line along the proposed alignments of North 19th Avenue and Oak Street. In addition, a natural gas distribution line is located along Oak Street between North Seventh and North 19th Avenues. Underground telephone cables are also located within the proposed rights-of-way for North 19th Avenue and Oak Street.

Utilities along Kagy Boulevard between South Third and South 11th Avenues are located outside of the existing 90-foot-wide right-of-way corridor with the exception of those provided by the City of Bozeman. An eight-inch sanitary sewer, a six-inch water main, and storm drainage lines are all located within the existing right-of-way. West of 11th Avenue, city water and sanitary sewer lines have been extended to provide service to the University Village Apartment complex. Telephone services are underground and located outside of the existing right-of-way except for this area where overhead lines share poles with a single-phase power line.

5. Economy

a. Overall Area Economic Base

The economies of the City of Bozeman and Gallatin County experienced a recession from late 1979 to mid-1980; however, during the past five years, the local economy has shown a steady recovery. In fact, from the 1979 to 1984 the area experienced significant in-migration and maintained relatively low unemployment rates compared to the state as a whole. The primary stabilizing force in the area economy has been Montana State University.[38]

[38] "The Bozeman Area Economy in 1984", Maxine C. Johnson, Bureau of Business and Economic Research, University of Montana, April, 1984.

Several sectors of the local economy have not fared well in recent years. Cash receipts from farm marketings and net farm income have declined since 1979 in the Bozeman trade area. Railroad payrolls and the wood products industry have declined as well. However, other basic industries such as mining (due mostly to activity in Madison County), tourism and trade, local manufacturing and the University have all recovered and shown increases in labor income since 1979.

According to a recent study of the local economy, it is anticipated that the Bozeman area will experience modest population and economic growth in 1985.[39] This strength will come from those same basic industries that have shown growth since 1979. The area will continue to be dependent on MSU to a significant degree.

[39] "The Bozeman Area Economy in 1984", Johnson.

b. Labor Force and Employment Characteristics

More than 22,400 jobs existed in Gallatin County in 1982.[40] Salaries paid to workers associated with MSU contributed 44% followed by manufacturing (20%), tourism and trade (19%), federal government (14%), and agricultural services (3%).

[40] "Employment by Type and Broad Industrial Sources -Gallatin County", REIS, Bureau of Economic Analysis, April, 1984.

Employment varies not only seasonally but annually. During the last six months of 1984 (July - December), the unemployment rate ranged from 4.0% to 5.1% in Gallatin County, with December having the highest rate and September the lowest unemployment rates. The six-month average unemployment rate for Gallatin County was 4.5% compared to 5.6% for 1983. The unemployment rate in Bozeman was about one percent higher than the County and both were well below Montana's average unemployment rates during the same period.

c. Project Area Economy

There are very few businesses located within the immediate project corridor. Aside from the public and quasi-public employment provided by the University and three churches in the Kagy Boulevard area, the only other employment and business activity is located at the corner of North Seventh Avenue and Oak Street. A car wash and gas station are located just north of Oak Street and a large motel and restaurant is located south of Oak Street. The entire length of North Seventh Avenue between Baxter Lane and Main Street is devoted to local business enterprises.

6. Transportation Systems

a. Road and Street System

North 19th Avenue, Oak Street and Kagy Boulevard are important elements of the major street network and are classified as minor arterial streets in the Bozeman Transportation Plan. In addition to these streets, Highland Boulevard, South 19th Avenue, a link between North Seventh and Rouse Avenues, and Rouse Avenue are part of a planned arterial street system around the perimeter of Bozeman. This arterial route will facilitate traffic movements in developing areas of the community and will provide more desirable linkage between Interstate 90 and U.S. 191 (FAP 50), which leads to Yellowstone Park and Idaho. Recent projects on Kagy Boulevard, Highland Boulevard, and North 19th Avenue constitute significant progress towards realizing a major community transportation goal.

The street system in the North 19th - Oak Street project area includes minimal or no public roadway facilities from Durston Road to Baxter Lane and from North 19th Avenue to North Seventh Avenue. Local subdivisions are served by paved roadways. A portion of Kagy Boulevard between South Third and South 11th Avenues has paved roadways with curbs and gutters. Kagy Boulevard between South 11th and South 19th Avenues is a discontinuous roadway ranging from an unimproved dirt trail to a narrow gravel-surfaced road.

Several important local streets or roads, including Durston Road, Baxter Lane and North Seventh Avenue, will intersect the proposed alignment of North 19th Avenue and Oak Street. The importance of these roadways is reflected in their inclusion on the Federal Aid System. Traffic on Baxter Lane is primarily the result of residential development west of Bozeman. North Seventh Avenue (FAU 1207) and Durston Road (FAU 1204) not only serve local residential and commercial traffic but provide an often used alternate route between Interstate 90 and U.S. 191. The proposed alignment of Kagy Boulevard will be intersected by local streets which serve residential areas and the MSU campus. South 19th Avenue (FAU 1201) and South Third Avenue traffic is generated by residential areas and recreational opportunities in the lands south and west of the city. South Seventh and South 11th Avenue (FAU 1203) traffic is primarily generated by the University; however, a large apartment complex, a small commercial area with movie theatres, and an electronics manufacturing plant located south of the campus are notable generators of Kagy Boulevard traffic.

b. Air Service

The study area is served by one major airport, Gallatin Field, which is owned and operated by the Gallatin Airport Authority. A new terminal, located approximately ten miles west of Bozeman near the town of Belgrade, was constructed in 1978. The facility is utilized by Big Sky, Frontier, Northwest Orient, and Western Airlines, which provide air cargo and

passenger service. Several charter services and the general flying public also utilize the facilities at Gallatin Field.

c. Rail Service

Burlington Northern Railroad provides the only rail service within the Bozeman area. The Burlington Northern does not offer passenger service to Bozeman; however, it does provide freight service, as needed.

d. Public Transportation

Residents of Bozeman are served daily by one inter-city bus line that provides both passenger and freight delivery service. Three charter bus services operate in the area and typically provide transportation to and from Yellowstone National Park or local ski areas. Although several attempts have been made to establish a local commuter bus service within Bozeman, such services are not currently available to residents. A feasibility study which examined local mass transportation alternatives was recently completed by the engineering department at Montana State University.

7. Traffic

a. Traffic Counts

Traffic surveillance counts are performed at least once per year at more than 100 locations in the Bozeman urban area by MDOH personnel using portable machine counters. The counts are typically collected over a one to three day period at each location and are manually adjusted to annual average daily traffic (AADT) through the application of seasonable adjustment factors for the area. These short-term "blanket" counts provide an approximation of the traffic at a particular location and are indicative of overall traffic trends. The accuracy of the counts are judged to be within ten percent of the actual traffic volumes for urban areas like Bozeman. Selected surveillance count locations on the arterial street system in the Bozeman are depicted in Figure 11. Additionally, the average daily traffic that occured at each of the selected count locations is presented in the figure.

b. Existing Traffic Conditions

The affected environment with respect to traffic includes the western and southern portions of Bozeman generally bounded by Seventh Avenue and College Street. It is evident from Figure 11 that the majority of the traffic within this area is carried by North Seventh Avenue, West Main Street, Durston Road, College Street, and South 11th and South 19th Avenues. Traffic on these arterial streets is primarily generated by rapidly developing residential areas in and adjacent to the city, several large commercial centers, and Montana State University.

Studies conducted for the Bozeman Transportation Plan indicated that peak travel periods (morning, noon, and evening)

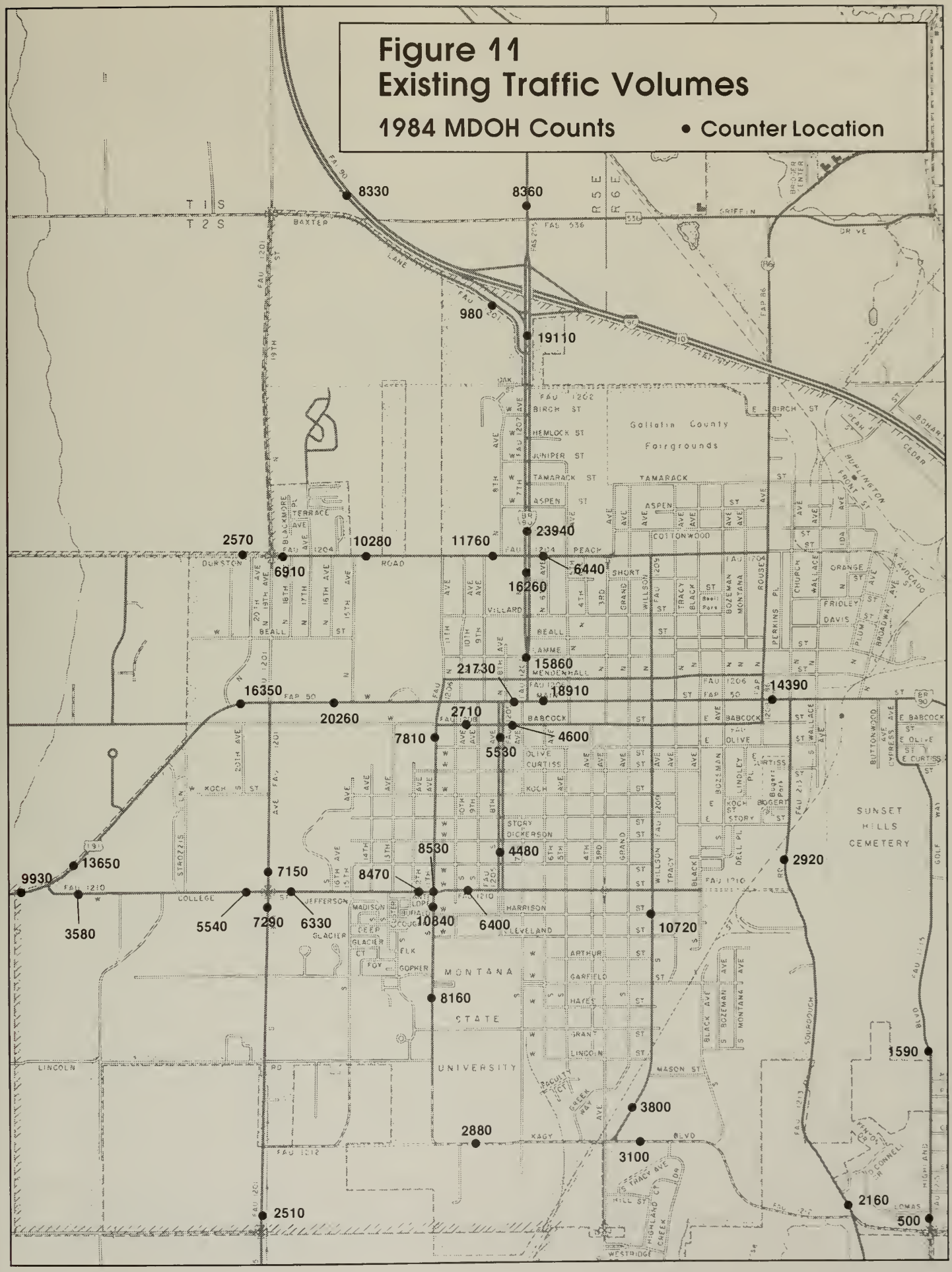


Figure 11
Existing Traffic Volumes
1984 MDOH Counts
• Counter Location
8330
8360
980
19110
2570
10280
11760
23940
6910
6440
16260
21730
15860
16350
18910
14390
20260
2710
7810
4600
5530
8530
4480
2920
9930
13650
7150
8470
3580
5540
7290
6330
10840
6400
10720
8160
1590
3800
2880
3100
2510
2160
500
T 1 S
T 2 S
R 5 E
R 6 E
BAXTER
GRIFFIN
DRIVE
LANE
Gallatin County
Fairgrounds
BIRCH ST
HEMLOCK ST
JUNIPER ST
TAMARACK ST
ASPEN
COTTONWOOD
PEACH
ROAD
DURSTON
TERRACE
BLACKMORE
VILLARD
BEALL
LAMME
MENDENHALL
BABCOCK
OLIVE
CURTISS
KOCH
STORY
DICKERSON
HARRISON
MADISON
JEFFERSON
COLLEGE
CLEVELAND
ARTHUR
GARFIELD
HAYES
GRANT
LINCOLN
MASON ST
MONTANA
STATE
UNIVERSITY
SUNSET
HILLS
CEMETERY
GOLF
BOZEMAN
BLACK
WILLSON
TRACY
GRAND
ORANGE
FRIDLEY
DAVIS
CHURCH
WALLACE
BUTTONWOOD
CYPRESS
E. BABCOCK
E. OLIVE
E. CURTISS
BOHART
CEDAR
BURLINGTON
FRONT ST
AVOCADO
BROADWAY
PLUM
ROUSE
PERKINS PL
MONTANA
BOZEMAN
LINDLEY PL
DELL PL
SOURDOUGH
BLVD
MONTANA AVE
BLACK AVE
HIGHLAND
O'CONNELL
LOMAS
FACULTY CIRCLE
GREEK WAY
XAGY
BLVD
TRACY AVE
HILL ST
HIGHLAND CIR
WESTRIDGE
FAP 90
FAS 536
FAP 86
FAP 50
FAU 1201
FAU 1202
FAU 1203
FAU 1204
FAU 1205
FAU 1206
FAU 1207
FAU 1208
FAU 1209
FAU 1210
FAU 1211
FAU 1212
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FAU 1231
FAU 1232
FAU 1233
FAU 1234
FAU

are typically less than 20 minutes; but notable delays occurred at the signalized intersections on Main Street and North Seventh Avenue.[41] Heavy traffic and congestion at major intersections during these peak periods has undoubtedly prompted drivers to utilize lesser arterials and collector streets in an effort to reduce delays.

[41] "Bozeman Transportation Plan", p. 10.

Traffic in the immediate project areas has continued to increase in recent years as adjoining facilities have been constructed and the rate of residential/commercial development has increased. Problems have developed in recent years as increasing traffic volumes are forced to utilize minimal traffic facilities.

E. Cultural, Recreational, and Visual Environment

1. Historical and Archaeological

a. Historical Background

Historical and archaeological records indicate that Indians frequented the Gallatin Valley for many years prior written recordkeeping. Evidence supports the belief that Indians came to the Valley during the summer to enjoy the plentiful supplies of fish, grass, and water; however, harsh winter conditions forced them out of the Valley each year. The Flatheads predominated in the Gallatin and upper Yellowstone valleys until the Crows were pushed westward. This immigration by the fierce Crow tribe forced the Flatheads into the Missoula and Bitterroot valleys. The seasonal occupation of the Gallatin Valley made it a natural meeting place for various tribes heading to the plains to hunt buffalo. Aside from isolated conflicts, the Gallatin Valley was generally a peaceful "common hunting ground" for all tribes.

The first description of record of the Gallatin Valley and the site of Bozeman was written by Lewis and Clark during their expedition in 1805. In subsequent years, the fur trade was responsible for bringing white men into the area as the major rivers in the valley provided an abundant source of pelts. The fur trade continued through the 1840's and was dominant until the discovery of gold and silver in Bannack and Virginia City in the early 1860's brought many immigrants to southwest Montana. John Bozeman, for whom the town was named, was one of many guides that led immigrant wagon trains to the Virginia City area. Bozeman also assisted a number of settlers in the organization of a new town and became an active promoter of the community. Bozeman became the county seat of Gallatin County in 1869. The city was once considered as a site for the state capitol in 1892; however, the city lost a vote on the matter and was awarded an agricultural college in 1893 by the Legislature.

After a boom period in mining ended in southwestern Montana, agriculture and the timber industry provided the impetus for continued development in the Bozeman area. Fertile farmland and an abundance of good rangeland allowed farming and cattle

ranching to flourish. The establishment of railroads in the area in the 1880's made Bozeman more accessible and increased its importance as a regional service center for agricultural and timber products. The agricultural industry, Montana State University, and the tourist industry continue to be the driving forces behind the economy of Bozeman and much of Gallatin County.

b. Archaeological and Historical Data

In order to assure compliance with federal historic preservation regulations (Section 106 of the National Historic Preservation Act and Executive Order 11593), the Montana Historic Preservation Officer and the MDOH Anthropologist were consulted regarding the presence of historic or cultural materials within the project areas. Based on these consultations, it was determined a cultural resource survey was warranted due to the lack of information on the project areas and the likelihood of historic sites or cultural materials with the areas to be affected by the projects. The cultural resource survey, conducted by Historical Research Associates of Missoula, did not identify any archaeological resources in the project areas; however, the survey did identify two historic sites within the project areas. These sites consist of the Boylan farm, located near the intersection of Kagy Boulevard and Willow Way, and the Smith farm, located at the northwest corner of the North 19th Avenue - Durston Road intersection.

The Boylan farm site consists of a house and several farm-related out buildings and was the location of the original Gallatin County Poor Farm. The Poor Farm operated from the mid-1880's to 1905 on a contract basis in support of the county's poor residents. Although some structures at the site may date to the Poor Farm period, most appear to have been moved from their original locations. Since many of the key Poor Farm structures have been destroyed, the integrity of the site has been severely compromised. Therefore, it was determined that the Boylan farm does not meet the eligibility requirements for listing on the National Register of Historic Places."[42]

[42] "Cultural Resource Inventories of the Kagy Boulevard and North 19th Avenue/Oak Street Extensions", Historical Research Associates, Missoula, August 9, 1984, p. 19.

The Smith farm site consists of a two and one-half story wood frame farmhouse constructed in the 1890's and several farm or ranch-related buildings. The cultural resource survey determined that the architectural style of the farmhouse is unique for its time period and in the structural history of Bozeman.[43] Three other structures on the site including a barn, a granary, and a small outbuilding add to the significance of the property. Therefore, the Smith farm was determined to be a historic property and meets the eligibility requirements for listing in the National Register due to its local architectural significance. A more extensive discussion of project area historic resources and the impacts of the proposed construction is contained in Part V: "Section 4(f) Evaluation.

[43] Historical Research Associates, p. 28.

2. Recreation

Two park areas are located near the proposed alignment of North 19th Avenue and Oak Street. The largest park area is a

2.2 acre city-owned parcel located adjacent to the proposed Oak Street alignment and to the west of North Seventh Avenue. This park, known as the North Ninth Avenue Park, is currently undeveloped and difficult to access. Based on an assessment of community recreational needs contained in local planning documents, this park will ultimately be developed as a neighborhood park with limited picnic and play facilities. A small park area also exists in the Covered Wagon Mobile Home Park located south and east of the proposed project. This private park has limited playground facilities and is primarily used by residents of the mobile home park.

The eventual development of the Annie Subdivision located west of North 19th Avenue will add new parklands to the project area. The initial phase of the subdivision development will include a small, privately-owned and maintained park which will serve as a buffer area around a mobile home park. Eventually, an additional park area, located immediately north of a future Oak Street extension into the subdivision, will be dedicated to the City of Bozeman. A 20-foot-wide gravel surfaced roadway will be provided as a temporary access to the park area. This park area will also be the site of a stormwater detention facility planned by the City.

Recreational opportunities within the Kagy Boulevard project area are offered primarily at Montana State University. The proposed alignment of Kagy Boulevard is adjacent to several large intramural ball fields, a football stadium, and a track and field complex. Bozeman School District No. 7 owns a parcel of property, located on South Black Avenue approximately one-quarter mile east of the Kagy Boulevard - South Third Avenue intersection, which is currently used as a park and baseball field. The City of Bozeman recently acquired a 15-foot-wide portion of the former Milwaukee Road railroad right-of-way for development of a linear parkway in the southeastern portion of the city. The parkway will extend from the Kagy Boulevard - South Third Avenue area, northeasterly to South Church Avenue and will be available for walking, jogging, bicycling, cross-country skiing, and other non-motorized uses.[44] The proposed improvement of Kagy Boulevard will not take any property from this linear park.

44 "City to Hear Update on Linear Parkway", Bozeman Chronicle, July 15, 1985.

3. Visual Resources

The visual character of the project study areas are directly affected by the development along the proposed alignments. Residential development to the east of North 19th Avenue and commercial development near the Oak Street - North Seventh Avenue intersection has limited the visual resources of the North 19th Avenue - Oak Street corridor to views of foothills and the nearby mountain ranges. Unrestricted views of these landscapes are possible from several locations along the travel corridor; however, proposed developments of adjacent agricultural lands will ultimately restrict such views. Similarly, development on the Montana State University campus and in residential areas adjacent to Kagy Boulevard has limited visual resources to views of mountain ranges to the south

and west of Bozeman. Since few development proposals currently exist for the private properties south of Kagy Boulevard, it is anticipated that these views will remain relatively unchanged in the immediate future.

Part IV: Environmental Consequences

A. Introduction

Using the existing environmental conditions summarized in the preceding chapter as a baseline, the potential impacts for each of the roadway alternatives proposed have been projected and evaluated relative to the categories previously discussed. The comparison of the potential impacts for each alternative roadway design provides an objective means by which the alternatives can be evaluated and a preferred alternative selected.

It should be recognized that the projection of potential environmental impacts is a process with inherent limitations. Where possible, empirical and/or mathematical models have been used to quantify impacts. This is generally the case with direct impacts of the proposed roadway since such impacts are usually more apparent. However, indirect or secondary impacts (impacts related to factors other than the construction and physical presence of the roadway such as secondary growth due to roadway improvements, land use changes, etc.) are often less obvious and more difficult to assess. Where possible, these secondary impacts have been quantified and/or discussed in descriptive terms.

Since rights-of-way sufficient to accommodate four-lane facilities will be acquired and cleared for all build alternatives, environmental impacts are generally similar. The magnitude of some impacts, most notably noise, air quality, and water quality may be somewhat variable by facility size but not to a degree that allows discernible distinctions among the alternatives.

B. Physical Environment

1. Geology and Soils

The subsurface geologic materials likely to be encountered in the areas of the proposed projects consist of alluvial fan deposits. This material typically includes silt, sand, and gravel deposited as outwash from surrounding mountain ranges. The nature of these subsurface deposits is well suited for road construction since the course-grained materials have a low sensitivity to vibrations allowing the material to maintain its strength through years of heavy traffic usage. Alluvium also has a low compressibility which indicates that excessive settlement of the roadway base is unlikely. The material encountered during construction should be easily excavated and would serve as adequate fill. The unconsolidated nature of these subsurface deposits results in a material that is easily erodable and caution must be taken to avoid sedimentation in areas subject to surface water runoff.

The surface soils encountered during the construction of North 19th Avenue - Oak Street and Kagy Boulevard were formed from the alluvial parent materials which underly each project area.

Summary of Impacts

The nature of the material underlying the project areas is well suited to road building due to its low compressibility and resistance to vibrations. The surface soils in each project area are poorly to moderately drained and have a potential for frost heaving. Surface materials will be excavated and replaced with formulated base materials. Topsoil will be stripped, stockpiled and replaced on disturbed areas. Impacts will generally be similar for each construction alternative, but the magnitude of impact will be variable by the width of each alernative.

These materials determine many of the physical characteristics of the soils and are useful in predicting the limitations of each soil type. The soils of both project areas are poorly to moderately drained and may present some engineering limitations due to the potential for frost heaving. Construction of the roadways will excavate much of the surface material and replace it with a formulated base material of a uniform nature to enhance the durability of the new roadways. The topography of the North 19th Avenue - Oak Street and Kagy Boulevard areas will not require any major road cuts or fills thereby limiting the potential for surface erosion and subsequent damage to the surrounding environment.

The impacts on the geology and soils of the proposed project areas will be similar for all build alternatives; however, the extent of this impact will vary by alternative. Each improvement alternative employs similar design considerations, but earthwork quantities (i.e. excavation, embankment, etc.) would vary for each roadway width. Obviously, the quantity of excavation required for two-lane alternatives would be less than that required to construct a four-lane facility. It should be noted that for each improvement alternative except the 43-foot-wide two-lane, initial construction of a two-lane facility would be followed by an expansion to four lanes as warranted by future traffic. The preparatory excavation required to upgrade each of the two-lane roadways to four lanes will be completed during the initial construction activities. The proposed design that involves construction of one-half of a future four-lane facility (Alternative No. 5 for both projects) may require the completion of minor earthwork prior to the installation of new base course material since the unused portion of the right-of-way would have revegetated and been subjected to erosional processes. All construction alternatives will include the installation of curbs, gutters, and storm drainage provisions, thereby minimizing the potential for surface erosion and sedimentation adjacent to the roadway. Impacts on the geology and soils of each project area are, therefore, considered minimal for all construction alternatives.

2. Water Resources and Quality

Impacts to water resources and quality primarily involve the potential water pollution associated with stormwater runoff. The drainage of the roadway structure coupled with accumulated pollutants from the roadway and right-of-way provide the mechanism by which pollution of surface or groundwaters can occur.

In conjunction with the various roadway alternatives proposed for Kagy Boulevard and the North 19th and Oak couplet, roadside curb and gutter and piped storm drainage systems are proposed. Such systems would effectively capture runoff from the roadway surface using a combination of inlets, manholes, and piped connectors. So collected, runoff may require temporary detention for treatment prior to discharge to a receiving watercourse. Drainage from adjacent, unpaved right-of-way and peripheral areas will be handled by culverts and drainage structures as local topography dictates.

Impacts to water-related utilities and services due to construction or alteration of the project corridors should be considered and mitigated in the design of the new facilities. Recognizing future development of the adjacent areas, utility service will be needed. Existing utilities will need to be preserved and extended to keep pace with local development needs. Future utility upgrading requirements along with promotion of suitable access for continued maintenance should be considered in roadway design. Consistent utility locations within the right-of-way for all new or replacement installations would be advisable.

a. Surface Waters

Stormwater runoff modeling techniques have been developed for predicting the types and concentrations of pollutants generated by functioning highways. One of the models currently available was published by FHWA in February, 1981.[1] This model was used to predict pollutant generation and surface water quality impacts for the proposed Bozeman Arterials alternatives.

1 "Constituents of Highway Runoff - Vol. III: Predictive Procedures for Determining Pollutant Characteristics in Highway Runoff", Report No. FHWA/RD-81/044, FHWA, Office of Research and Development, February 1981.

Route length, shoulder design (e.g., curbed or uncurbed), and average daily traffic (ADT) are the primary input parameters for the model. Roadway width and number of lanes do not significantly affect the pollutant load generated by the roadway.[2] Since the roadway alternatives all have similar curbed shoulders and comparable traffic volumes, the FHWA model indicates that resulting pollutant loads for the alternatives will be essentially the same. The primary pollutant contained in urban and highway runoff is total solids, a sizable fraction of which becomes suspended solids in water. Associated with these total solids are nutrients, heavy metals, and organic compounds.

2 "Constituents of Highway Runoff - Vol. III", FHWA.

The evaluation of a worst-case situation with respect to pollutants generated by the roadway alternatives utilized the following approach. The 100-year, six-hour storm event was selected from hydrogeologic records as a source of runoff far exceeding the normal occurrence. A 20-day dry period was assumed preceding the storm. Pollutants deposited along the combined 2.4 miles of roadway corridor by an ADT of 20,000 vehicles per day during this period were quantified and presumed to all discharge to the East Gallatin River and be diluted by the annual average flow therein for the period of the storm duration. The ADT selected represents a conservative, worst-case average for all portions of the project. Table No. 6 contains the results of this idealization and compares the predicated pollutant concentrations to background and allowable concentrations.

Based on this idealization, background concentrations of suspended solids, phosphate, chloride, copper, and zinc could be expected to increase by factors ranging from one-tenth to two. While violation of statutory water quality standards would not be expected to occur, this could result in slight degradation of the stream and is the obvious result of a relatively low average flow in the river and, hence, limited opportunity for

Summary of Impacts

Assuming a worst case, modeling suggests that background concentrations of suspended solids, heavy metals, and organic compounds could be expected to increase if all surface runoff were discharged directly to the East Gallatin River. Although statutory water quality standards would not be violated, some degradation of the existing surface water quality could result due to the low average river flow in the East Gallatin. In reality, pollutant contributions to surface water would be less than those predicted by the model because vegetation and soils would afford effective attenuation of pollutants prior to discharge. Modeling does suggest that storm water should be routed through detention facilities to provide primary settling before discharge.

dilution. In reality the pollutant contribution to the river and its tributaries would be substantially less than shown in Table No. 6 for several reasons including: 1) the washoff of pollutants accumulated along the corridor would be less than the total generation; 2) some absorption of pollutants would occur in soil and vegetation prior to runoff reaching the river; 3) the dilution of the pollutants would be greater during most major storm events due to higher than average river flow; 4) natural percolation of runoff to the soils would reduce volumes reaching the river and afford effective soil attenuation of pollutants; and 5) some settling and filtration of pollutants would occur in drainage ways transporting the runoff.

Table No. 6

Predicted 100-Year, Six-Hour Storm Pollutant Loads to East Gallatin River

Pollutant	Total Generation[1] (LBS)	E. Gallatin River Potential Contrib.[2] (MG/L)	E. Gallatin River Concen.[3] (MG/L)	MDHES[4] Concen. (MG/L)
Total Solids	2,610	16	--	--
Suspended Solids	1,460	9.0	12 - 2,000	25[5]
Volatile Suspended Solids	410	2.5	--	--
Total Kjeldahl Nitrogen	18	0.11	--	0.35[6]
Total Organic Carbon	170	1.04	--	--
Biochemical Oxygen Demand	110	0.67	--	--
Phosphate	5.6	0.034	0.02 - 0.20	0.05[7]
Chloride	197	1.21	0.2 - 5.4	250
Iron	46	0.28	--	0.3
Lead	2.7	0.017	0.17 - 11.0	5.0
Chromium	0.15	0.0009	--	0.05
Copper	0.89	0.0055	0.01 - 0.02	1.0
Cadmium	0.13	0.0008	< 0.01	0.002
Mercury	0.006	0.00004	< 0.0002	0.002
Zinc	1.6	0.010	< 0.01 - 0.04	5.0

1. Predicted generation rate based on FHWA Predictive Procedure (FHWA Report No. FHWA/RD-81/044) for an ADT of 22,000 vehicles between the project corridors with 20 days since last "washoff".
2. Contribution to the East Gallatin River is based on the assumption that all pollutants generated reach the river where the average flow is 88.4 cfs.
3. Based on USGS and MDHES water quality data; characteristic values or ranges are shown.
4. Based on 1979 Secondary Drinking Water Standards and revisions as referenced in MDHES "B-1" Water Quality Designation.
5. U.S. Department of the Interior guideline to safeguard freshwater fisheries (no standard exists).
6. MDHES-suggested guideline for total inorganic nitrogen (no standard exists).
7. MDHES-suggested guideline for total phosphorus.

However, model analysis suggests that collected stormwater be routed through detention facilities providing primary settling wherever possible before discharge. Primary settling could be

expected to remove approximately two-thirds of the suspended solids, thereby reducing associated pollutants correspondingly.[3] Such provisions would reduce the predicted pollutant load reaching the East Gallatin River substantially, affording a more preferable margin of safety against stream degradation. No adverse impact would be caused to the water quality of the river or its tributaries with the inclusion of such primary treatment through stormwater detention.

[3] Wastewater Treatment and Disposal, Metcalf & Eddy, Inc. 1976.

In the past years, de-icing salt (sodium chloride) used on city streets has averaged approximately 1,400 pounds per mile per winter, applied in combination with sand.[4] This application is much less than salt applications typically used for snow and ice control in midwestern states. The salt is mixed with sand to soften snowpacked roadways and keep damp sand from freezing in application machinery. Based on this average salt application rate, approximately 3,900 pounds of de-icing salt would be applied each winter on the project corridors.

[4] Dick Holmes, Director of Public Works, City of Bozeman, in a personal communication September 24, 1985.

Since salt requirements are directly related to the roadway surface area involved, the application could be expected to increase with increased roadway widths. Conservatively assuming that twice the average application, or 7,800 pounds per winter, was applied to the widest four-lane alternative under consideration and was discharged directly to the East Gallatin River and diluted by the average flow thereof for a four-month period (similar to the comparison presented in Table No. 6), a rise in the ambient chloride concentrations of 0.14 mg/l could be expected. This compares with the existing ambient concentration of 0.2-5.4 mg/l chloride. Such a conservative oversimplification obviously ignores many mitigating influences such as vegetative and soil attenuation of the salt load. "No effect" levels reported in the literature for almonids and other cold-water biota are in excess of 1,000 mg/l. Threshold concentrations for human taste are reported to be anywhere from 200 to 900 mg/l. A limit of 10 mg/l is recommended for cardiac patients.[5] Recognizing the many-fold factor of safety involved, no adverse impact is possible. Obviously a radical increase in roadway salting activity could alter the situation, but this would have to involve an increased salt application of many, many times greater than present policies.

[5] "Water Quality Criteria", McKee and Wolf, California State Water Resources Control Board, 1963, p. 258.

Since washoff of pollutants occurs more thoroughly from roadway pavements than grassed roadsides, it can be assumed that a broader expanse of pavement has comparatively greater pollution potential. However, in view of the conservative assumptions of the preceding model analyses, even the worst-case situation would not result in adverse impacts. Thus all of the alternatives can be considered as comparable in their generation of surface water pollution, and the impact for all of the alternatives would be negligible.

The Federal Water Pollution Control Act authorized discharge permits for urban stormwater discharges. However, the State of Montana, under its Montana Pollutant Discharge Elimination System, has chosen not to implement the federally-authorized permit system for such discharges; and no requirements for discharge permits for stormwater discharges is in effect in

the state. The MDHES Surface Water Quality Standards and associated B-2 classification for the East Gallatin River could not and would not be violated. The MDHES has also published a set of guidelines for management of stormwater runoff.[6]

6 "Stormwater Management Guidelines", MDHES Water Quality Bureau, January 1981.

In conclusion, the runoff collected along the roadway corridors should be routed through detention facilities providing primary settling wherever possible before discharge to the East Gallatin River. Given such treatment for the majority of the corridor stormwater, adverse surface water quality impacts would not be expected. Measures to mitigate water quality impacts are discussed in Part VI: Mitigating Measures of this document.

b. Groundwater

Summary of Impacts

No adverse impacts to groundwater as a result of runoff contamination are anticipated with any construction alternatives. Since the pollutant load is distributed over the length of the corridor and the alluvial soils of the area are well suited to the removal of contaminants by filtration, groundwater quality should be safeguarded. The lining of storm water detention ponds would also prevent polluted runoff from reaching groundwater sources.

The greatest potential for adverse impacts to the groundwater from any given roadway alternative would exist with the percolation of polluted stormwater runoff. This should be successfully mitigated on several counts. The nature of the contaminants in runoff, as discussed in the preceding section "Surface Waters", is largely settleable and suspended solids, which are effectively removed by physical filtration. The graded soil particle sizes typical of the area's alluvial soils are well suited to this sort of removal. Additionally, the predicted pollutant load is distributed over the entire corridor length, greatly dispersing the effect. Seepage of polluted runoff from stormwater detention ponds would be prevented by the lining of pond floors with low permeability soils, as is standard in the design of such facilities. It should also be noted that no groundwater pollution has been demonstrated due to the other myriad of roadways in the municipal area. The effectiveness of soil treatment of stormwater is further attested by the exemption of such discharges to groundwater from the requirement of the Montana Groundwater Pollutant Discharge Elimination System.

The general ten-foot or greater separation to groundwater also provides a margin of safety and results in a good filtration path for percolating runoff. The majority of the predicted pollutants are associated with the suspended solids in the runoff, and it should be noted that trace heavy metals such as those typical of highway runoff are very effectively attenuated by the natural clay particles in the soil.[7]

7 "Sludge Treatment & Disposal - Vol. 2", EPA Publication No. EPA-625/4-70-012, US EPA October 1978, pp. 104-106.

Due to the comparatively low salt applications used along the corridor, discernible adverse impacts to groundwater from runoff containing sodium chloride would not occur. Current modeling techniques for the influence to domestic wells from roadway salting indicate that even in a worst-case situation; i.e., a domestic well situated only 25 feet from the roadway where one mile of corridor drains toward the well and where groundwater is only five feet from the ground surface, adverse effects are highly improbable.[8] It should be pointed out that the foregoing modeling technique has been empirically developed for dug rather than drilled wells. However, the model predicts the amount of salt reaching the groundwater table and, thus, provides a good simulation of conditions in the

8 "Economic Impact of Highway Snow and Ice Control", Report No. FHWA/RD-77/95, FHWA Office of Research and Development, 1977, pp. 37-39.

field irrespective of the type of well involved. Other mitigating influences to prevent salt contamination of the groundwater in the study area such as vegetative and soil attenuation provide additional safeguards.

A secondary potential for adverse impacts to the groundwater would be from contamination of surface water providing aquifer recharge. The East Gallatin River and its tributaries provide recharge to the groundwater underlying the area. As documented in the preceding section, "Surface Waters", adverse impacts to the quality of surface waters of the area are not expected; and, therefore, the groundwater would be safeguarded.

Thus, no adverse impacts to groundwater as a result of runoff contamination are anticipated with any alternative under consideration.

c. Sanitary Sewers, Water Mains, and Storm Drainage

No adverse impacts to existing or proposed water and sewage facilities are anticipated with any of the alternatives under consideration. The existing municipal outfall sewer which traverses the Oak Street corridor and water and sewer mains elsewhere on the project corridors are at sufficient depth to be unaffected by roadway construction. No relocation or impact to their serviceability will occur. Development, encouraged by roadway construction in the area, will create demand for new sewage collection laterals. The existing outfall sewer line is sized to handle such projected future flow contributions.[9]

[9] "Wastewater Facility Plan for the City of Bozeman, Mt.", Thomas, Dean & Hoskins, Inc., 1980.

Similar demands for new collection sewers and water distribution mains will occur in conjunction with development along the remainder of the project corridors. Such improvements have been considered in area planning and are implicit with municipal annexation. Thus, adverse impacts would be effectively mitigated.

The City may want to consider the installation of casings for certain future piped municipal utilities beneath the project corridors ahead of roadway construction to defray future costs associated with pipe boring and jacking. Such a decision will depend on fiscal scheduling and project priorities by the City as well as the development plans for properties adjacent to the project areas. While roadway development will be a slight deterrent to maintenance excavation or installation of additional mains for system expansions, the effect is not expected to be severe. Utility improvements typically include pavement removal and replacement or special construction at major road crossings. Current Montana Department of Highways' policy prohibits open cuts in already constructed roadways except in the event of an emergency.

A potential adverse impact to existing water mains that can be successfully mitigated during roadway design would be reduced protection from freezing due to shallow earth cover in roadway cuts. This absence of appreciable cuts on the project coupled with design foresight should prevent any problem in this regard.

Summary of Impacts
No adverse impacts to existing or proposed water and sewage facilities are anticipated. Municipal water and sewer lines will not require relocation and are at sufficient depth to be unaffected by construction activities. Completion of the roadways and subsequent development of the project areas will undoubtedly place additional demands on these public facilities. The Farmer's Canal located adjacent to North 19th Avenue will require relocation in a piped, underground conduit. All alternatives will include provisions for storm drainage collection and transport.

The proposed alternatives involving construction all include similar extensive storm drainage systems. The drainage provisions associated with those alternatives will make use of planned area drainage facilities (e.g., detention ponds) identified in the Stormwater Master Plan. Two new detention basins are proposed in proximity to the Oak Street alignment and should be considered in the design of roadway drainage facilities. Two natural drainages along Kagy Boulevard will receive the bulk of the collected stormwater flow, and municipal detention facilities are proposed downstream, insuring settling treatment and effective water quality control.

The existing Farmers Canal will require relocation in construction along North 19th Avenue between Durston Avenue and Oak Street. The open canal will be replaced with a piped, underground conduit as was done in the recently constructed portion of North 19th Avenue south of Durston Avenue. An outlet structure will be placed north of Oak Street allowing the flow to resurface. The conduit will jointly serve to collect roadway inlet drainage along this portion of North 19th Avenue. A structure is recommended at the north end to divert higher storm flows to the proposed municipal detention pond at the west end of Oak Street. The Middle Creek Canal will be unaffected by roadway construction along Kagy Boulevard.

Since the detention of stormwater is both desirable and an effective means of mitigating potential water quality and flooding impacts, consideration must be given to the availability of the proposed municipal detention facilities at the time of project construction. If the City's scheduling does not provide for the construction of these impoundments, alternate detention provisions should be made. The design of any interim detention facilities should be compatible with the ultimate design for the proposed facilities. A cooperative project between MDOH and the City could be considered to construct the necessary detention facilities.

d. Floodplains

Summary of Impacts
The proposed projects do not lie within the identified floodplains and will not directly affect any floodplains in the Bozeman area.

Based on the investigations conducted for this report, it was determined that neither the North 19th Avenue - Oak Street nor Kagy Boulevard project areas are located within any identified 100-year floodplains. Since the projects will not involve floodplain encroachment, the floodplains in the Bozeman area will not be directly affected. Storm drainage contributions to two natural drainages along Kagy Boulevard constitute a limited impact to those non-designated floodplain areas. However, due to the low, intermittent flows involved and the availability of adequate channel capacity, adverse floodplain effects are unlikely.

3. Air Quality

Traffic facilities such as roadways are considered to be indirect sources of air pollution because the facilities themselves do not generate pollutants, but they attract pollutant sources such as automobiles and trucks. The pollutants

generated by traffic are carbon monoxide (CO), oxides of nitrogen (NO_x), and total suspended particulates (TSP). The project areas are unclassified for total suspended particulates and as unclassified for carbon monoxide and nitrogen oxides.

Summary of Impacts

Construction of the projects would result in increased TSP and CO concentrations in areas adjacent to the roadways, especially since the projects will pass through relatively undeveloped areas. A net decrease in TSP and CO concentrations along the major street network is expected since traffic and congestion on several major routes will be reduced. Federal and state air quality standards are not likely to be violated as a result of the proposed projects.

The direct impact of constructing North 19th Avenue, Oak Street, and Kagy Boulevard will be an increase in both TSP and CO concentrations in the areas adjacent to the new roadways. However, these increases would be negligible when compared with the expected concentrations at major intersections if the facilities were not constructed. The indirect impact of building the proposed roadways will be a decrease in both TSP and CO concentrations along portions of the street network in the western part of Bozeman. This benefit will result from the provision of traffic routes around the perimeter of the city. These more desirable routes will redistribute some of the traffic on the major street network and reduce congestion at several major intersections, thereby causing a reduction in TSP re-entrainment and CO emissions along the street network.

Since background concentrations of TSP and CO are low in the Bozeman area and the projected traffic volumes on the roadways are relatively low, violations of federal or state air quality standards are not expected to occur as a result of project construction. Carbon monoxide concentrations may be increased somewhat at several major intersections on North Seventh Avenue, Main Street, and Durston Road if the proposed projects are not constructed. It is conceivable that CO concentrations at some critical intersections may approach or exceed federal and state standards by the design year under a "no-build" scenario.

The proposed projects are in an air quality attainment area where the State Implementation Plan (SIP) does not contain transportation control measures. Therefore, the conformity procedures of 23 CFR 770 do not apply to this project.

a. Total Suspended Particulates

Although vehicles do emit some particles via exhaust, the most significant means of particulate generation by vehicles is in the re-entrainment of fugitive dust from along the roadway as vehicles pass.

An equation to evaluate a length of roadway as a source of particulate emissions was empirically developed for the Montana State Air Quality Bureau by the Midwest Research Institute.[10] The emission source evaluation equation in terms of pounds of particulate generated over the length of the roadway is as follows:

$$P = 0.45\ (4/N)(S/10)(L/5{,}000)(2/3)^{0.8}V \cdot M$$

where:

P = Weight of particulate matter generated along roadway (lbs)

[10] "Emission Factor Correction Parameters for Paved and Unpaved Roads, Final Report - Part II", Midwest Research Institute for MDHES Air Quality Bureau, November 1978.

S = Silt content of road surface material (%)
N = Number of travel lanes
W = Vehicle weight (tons)
L = Surface dust loading on traveled portion of road (lbs/mi)
V = Number of vehicles on the roadway
M = Length of roadway (miles)

The concentration of generated particulates will depend on the daily meteorological dispersion characteristics along the traffic corridors.

One of the most significant determinants of the amount of particulates generated from a section of roadway is the roadway design. The source evaluation equation shows an inverse relationship between particulate generation and the number of travel lanes. Assuming similar dust loading per unit area of traveled roadway, an equal surface area of traveled roadway per travel lane and equal traffic volumes, the source evaluation equation indicates that roadways with additional travel lanes will generate the same amount of particulates as a two-lane roadway. Extra lanes also reduce the amount of reentrainment or carryout of fugitive dust from sources adjacent to the roadway.

Curbs, gutters, and paved shoulders restrict the carryout by vehicles of fugitive dust from adjacent sources. In addition, curbs and gutters provide a mechanism for collecting dust which can then be removed from the roadway by street sweeping or flushing.

Maintenance practices can influence the amount and types of surface dust loading along a road. The type and quantity of sanding materials used during the winter months greatly affect the amount of loading and the silt content of the dust. Regular and appropriate street sweeping and flushing will reduce such loading.

Assuming similar surface dust loading per unit area of traveled roadway and traffic volumes, the source evaluation equation indicates that each of the alternatives for both project areas would generate the same amount of particulate matter. Any increase in TSP generation along the project routes as a result of increased traffic would be directly proportional to the increase. The decrease in TSP generation along alternative routes would be directly proportional to the number of operators choosing the project facilities over these routes. Therefore, all of the alternatives for either project are equally preferable if resulting TSP concentrations is the sole criterion for judgment.

b. Carbon Monoxide

Vehicle exhaust emissions and residential wood burning emissions are the two major sources of carbon monoxide in the Bozeman area. The carbon monoxide concentrations generated by traffic facilities depend primarily on traffic volume, vehicle

mix, vehicle speed, vehicle stops and delays, and air-mixing volume.

It is necessary to consider the sum of the pollution generated by the indirect source and the background concentrations at the upwind edge of the source when evaluating the impact on air quality of traffic facilities. This evaluation is necessary to determine whether this sum will violate federal and/or state hourly or eight-hour standards for CO concentrations. Generally, source specific contributions will dominate the total CO concentrations for the worst one-hour cases while high background concentrations will dominate the worst eight-hour cases. Short-term, source specific contributions are particularly evident during peak traffic periods. Low background concentrations of CO exist in the project areas due to the relatively undeveloped nature of the areas and the absence of traffic facilities.

The CALINE3 pollutant dispersion model was used to estimate and compare the CO impacts of each of the alternatives.[11] The network description and traffic demand volume are used to estimate the traffic flow characteristics in each project area. Data requirements include road width, design speed, percentages of heavy duty vehicles, diurnal traffic patterns, type of intersection control, and surface and upper air meteorological data.

[11] "CALINE 3 - A Versatile Dispersion Model for Predicting Air Pollution Levels Near Highways and Arterial Streets", FHWA/CA/TL-79/23, Office of Transportation Laboratory, California Department of Transportation, November, 1979.

Emissions for an extended section of roadway are considered uniform and are computed on the basis of vehicle speed and volume. Emissions at intersections are the sum of those produced from non-stopping vehicles and those emitted over a finite length of time by stopping vehicles. In general, for the same traffic volume, greater flow rates generate less carbon monoxide.

Emissions for the current year and the design year were interpolated and extrapolated from factors given in the Mobile Source Emission Factors.[12] Pollutant emission reductions are expected to occur by the design year in all important transportation-related pollutant categories, with carbon monoxide expected to show the greatest decrease. Representative meteorological information was taken from the surface wind summary for Gallatin Field.

[12] "Mobile Source Emission Factors", US EPA Report No. EPA-400/9-78-005, March 1978.

Each project was modeled separately for a CALINE3 analysis because of the distance between the project areas. One model included the North 19th Avenue - Oak Street traffic corridors and the other included the Kagy Boulevard corridor. Receptors were positioned at the more densely populated residential areas along the project corridors for both models. Assuming a worst-case background concentration of five ppm CO, which is higher than would be expected anywhere in or around Bozeman, one-hour and eight-hour federal standards were not exceeded at any of the modeled receptor positions along the project corridors in the design year. The CALINE3 models, however, do not take into account excess CO emissions for periods of traffic delays and excessive queuing when CO concentrations at intersections could be significantly higher.

Table No. 7 contains the predicted one-hour and eight-hour CO concentrations for each of the alternatives considered for North 19th Avenue - Oak Street and Kagy Boulevard.

Table No. 7
Predicted 1-Hour and 8-Hour CO Concentration by Alternative

NORTH 19TH AVENUE - OAK STREET ALTERNATIVES[1]

	Alt. 1 (No Build)		Alt. 2 (2-Lane)		Alt. 3 (2 and 4-Lane)		Alt. 4 (2 and 4-Lane)		Alt. 5 (2 and 4-Lane)		Existing	
	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.
Background Levels[2]	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Traffic Generated Levels[3]	-	-	1.5	0.9	1.5	0.9	1.5	0.9	1.5	0.9	-	-
Predicted CO Levels[4,5]	5.0	5.0	6.5	5.9	6.5	5.9	6.5	5.9	6.5	5.9	5.0	5.0

KAGY BOULEVARD ALTERNATIVES[6]

	Alt. 1 (No Build)		Alt. 2 (2-Lane)		Alt. 3 (2 and 4-Lane)		Alt. 4 (2 and 4-Lane)		Alt. 5 (2 and 4-Lane)		Existing	
	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.
Background Levels[2]	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Traffic Generated Levels[3]	0.8	0.6	1.4	0.8	1.3	0.8	1.3	0.8	1.3	0.8	0.6	0.4
Predicted CO Levels[4,5]	5.8	5.6	6.4	5.8	6.3	5.8	6.3	5.8	6.3	5.8	5.6	5.4

FEDERAL AND STATE STANDARDS

	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.
Federal Primary	35.0	9.0	35.0	9.0	35.0	9.0	35.0	9.0	35.0	9.0
Federal Secondary	-	9.0	-	9.0	-	9.0	-	9.0	-	9.0
Montana Standard	23.0	9.0	23.0	9.0	23.0	9.0	23.0	9.0	23.0	9.0

[1] Alternatives 4 and 5 are modeled exactly the same for a CALINE 3 analysis; Alternative 3 is also similar to 4 and 5 coinciding the sensitivity of a CALINE 3 analysis. Therefore, Alternatives 3, 4, and 5 were modeled by using the worst case geometry of Alternative 4. (Alternative 3 has a wider median and shoulders and, therefore, a greater mixing volume.

[2] Background value shown is a conservative estimate of CO concentrations that may occur in Bozeman. This value is a deliberate overestimation of background CO concentrations and will be used in the absence of current measured CO levels for the project areas.

[3] Traffic generated concentrations are predicted by the CALINE 3 Air Quality Model.

[4] Predicted CO levels are the sum of background and traffic generated levels.

[5] Concentrations for each alternative are for the design year.

[6] Alternatives 4 and 5 are exactly the same for a CALINE 3 analysis.

Table No. 7 shows that each of the build alternatives yields higher CO concentrations for modeled receptor locations. This is primarily because the project will pass through relatively undeveloped areas of the community. It should be noted that the background CO levels were deliberately overstated for modeling purposes since current measured CO concentrations are not available. It is apparent from the table that modeled CO levels will be significantly lower than federal or state standards even with overstated background levels.

There is no significant difference in the CO generation rates and resulting concentrations for the alternatives modeled for

the project areas. Therefore, all of the alternatives for either project are equally preferable if resulting CO concentrations is the primary factor for judgment.

4. Noise

The noise level impacts resulting from construction of North 19th Avenue - Oak Street and Kagy Boulevard may be determined by comparing existing and projected noise levels with the FHWA noise abatement criteria. The FHWA computer noise model SNAP 1.0 (Simplified Noise Analysis Program) was used to predict future noise levels along the project corridors for each of the alternatives evaluated in this study. Predictions of future noise levels are shown in Table No. 8. For the purposes of this analysis, design year noise levels were predicted for the "no-build" alternative and the two-lane and four-lane roadway alternatives with and without an additional I-90 interchange at North 19th Avenue. Modeling indicates that there is no appreciable difference in predicted noise levels generated by either the two-lane or four-lane roadway alternatives.

Summary of Impacts

SNAP 1.0 modeling for locations along North 19th Avenue, Oak Street, and Kagy Boulevard indicates that noise levels approaching or exceeding 70 dBA can be expected in the design year. Locations within 145 feet of the proposed centerline of North 19th Avenue, between Durston Road and Oak Street, will exceed 70 dBA in the design year. FHWA noise abatement criteria for residential land uses (70 dBA) may also be exceeded along the previously constructed portion of North 19th Avenue between Durston Road and Main Street. Predicted noise levels are not expected to exceed 70 dBA at any locations along Oak Street or Kagy Boulevard. Several residences near the intersection of Oak Street and North Seventh Avenue may experience noise levels of 70 dBA by the design year.

Table No. 8
Predicted Noise Levels
(30TH HIGHEST HOURLY TRAFFIC VOLUME)

Site No.	Distance from Centerline	1985 Adjusted L_{10} dBA	2008 L_{10} dBA Without Project	2008 Two-Lane Alternatives L_{10} dBA With Project	2008 Two-Lane Alternatives L_{10} dBA With Interchange	2008 Four-Lane Alternatives L_{10} dBA With Project	2008 Four-Lane Alternatives L_{10} dBA With Interchange
1	53'	*	*	70	69	69	68
2	64'	*	*	69	68	69	68
3	132'	*	*	67	66	66	65
4	110'	*	*	72	73	72	73
5	195'	*	*	67	68	67	68
6	50'	*	*	72	73	71	72
7	83'	63	65	69	71	69	70
8	84'	63	65	69	71	69	70
9	56'	66	71	71	71	70	70
10	78'	64	69	69	70	69	69
11	72'	68	73	73	73	73	73
12	88'	69	70	71	71	71	71
13	278' E/240' N	55	63	65	65	65	65
14	81'	*	*	64	64	64	64
15	125'	*	*	62	62	62	62
16	105' W/214' N	60	62	61	62	61	62
17	98'	56	63	64	64	64	64
18	424'	51	57	58	58	58	58
19	85'	58	63	63	63	63	63
20	63'	60	65	65	65	65	65
21	82'	59	64	64	64	64	64
22	65'	57	61	61	61	61	61

*Ambient noise level assumed to be approximately 50 dBA.

Based on the computer modeling, it is likely that noise levels along North 19th Avenue, between Durston Road and Oak Street, will exceed 70 dBA at locations within 145 feet of the proposed roadway centerline. The Smith farmhouse and 17 mobile homes located in the Covered Wagon Mobile Home Court are within 110 to 140 feet of the proposed centerline of North 19th Avenue. Noise levels along the previously constructed

portion of North 19th Avenue (West Main to Durston Road) are projected to increase 4 to 6 dBA with the addition of new traffic facilities to the north. It is anticipated residences within 85 feet of the centerline of the existing North 19th Avenue will experience noise levels greater than 70 dBA. Noise levels generated by design year traffic will not exceed the FHWA noise abatement criteria for residential uses (70 dBA) at any location along Oak Street or Kagy Boulevard. However, two residences located near the intersection of Oak Street and North Seventh Avenue may experience noise levels of 69 and 70 dBA by the design year.

Noise impacts will obviously be the most significant in areas where no traffic facilities presently exist and where existing traffic generated noise levels will be substantially exceeded by predicted noise levels. Ambient noise levels (approximately 50 dBA) are predicted to increase by 12 to 23 dBA as a result of construction of any of the build alternatives. Predictions of design year noise levels indicate increased traffic will produce increased noise levels along major arterial routes regardless of the proposed projects. As an example, modeling indicates noise levels along South 19th Avenue will exceed 70 dBA for all locations within 90 feet of the existing roadway centerline by the design year under a "no-build" scenario. Measures to mitigate noise impacts in the project areas are discussed in Part VI: Mitigating Measures of this document.

C. Biological Environment

1. Vegetation

Summary of Impacts

All vegetation within the project area right-of-way corridors will be removed prior to construction. Loss of trees near Durston Road - North 19th Avenue and Willow Way - Kagy Boulevard will be the most significant impact. The impacts are considered significant but unavoidable for all build alternatives.

There will be impacts to vegetation within the right-of-way corridors required for the construction of North 19th Avenue - Oak Street and Kagy Boulevard. The trees, shrubs, cropland and lawns which presently occupy these areas will be removed during construction. Impacts to vegetation within the North 19th Avenue - Oak Street corridor will be more significant than those anticipated for Kagy Boulevard since the proposed construction will pass through undeveloped lands. Paved, gravelled and dirt surfaced roadways currently exist along much of the proposed alignment of Kagy Boulevard. Some agricultural land will be lost to construction and riparian habitat associated with the irrigation canals and drainages in the project areas will be altered adjacent to the roadways. A small portion of a wetland area and several mature spruce and cottonwood trees will be eliminated along Kagy Boulevard. Loss of the mature trees from the Willow Way area will adversely affect visual qualities for local residents.

The narrower build alternatives would occupy less of the required right-of-way and would require less revegetation than wider design alternatives. Although differences between alternatives exist for both improvement projects, they are considered minor in view of the existing and proposed urban development of the study areas. The impacts to the vegetation in both project areas are considered as substantial but unavoidable for all build alternatives. Measures to mitigate impacts upon

area vegetation are discussed in Part VI: Mitigating Measures of this document.

2. Fish and Wildlife

Summary of Impacts

Right-of-way clearing and roadway construction will result in a loss of habitat for several bird and small mammal species. However, this displacement should not have a permanent negative impact on such species in the area. The projects are not expected to affect any federally-listed threatened or endangered species.

Much of the land adjacent to the North 19th Avenue - Oak Street and Kagy Boulevard project areas has been or is proposed for residential and commercial development. The extent of this development is variable over the length of each project and the least developed sections offer the greatest diversity in habitat. The right-of-way clearing and roadway construction of the proposed projects will result in a permanent loss of habitat for several bird and small mammal species. Displacement of these species should not have a permanent negative impact on wildlife populations in the area. Although it is not known if fish reside in any of the drainages crossed by the proposed projects, it has been established that aquatic insects, an important source of food for fish species, exist in the easternmost Oak Street and the Kagy Boulevard drainages. The Montana Department of Fish, Wildlife and Parks intends to conduct an electro-shocking survey in the Oak Street drainage to determine if fish species are present in the water course. The Department ultimately hopes to plant brook trout in this drainage. Potential adverse effects from roadway construction on fish species (if present) centers on sedimentation/siltation which may cause suffocation of eggs, young fish in spawning beds, and aquatic insects.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, consultations have been made with the U.S. Department of the Interior, Fish and Wildlife Service to determine if any federally-listed threatened or endangered species could inhabit the North 19th Avenue - Oak Street or Kagy Boulevard project areas.[13] These consultations determined that the proposed projects are not expected to affect any threatened or endangered species. This assessment complies with the requirements of the Act and concludes the consultation process.

[13] John G. Wood, Field Supervisor, Ecological Services, US DOT, Fish & Wildlife Service, Billings, MT in personal communications February 15, and March 16, 1985.

3. Wetlands

Summary of Impacts

The construction of Kagy Boulevard will take 0.22 acres from a two acre wetland area located north of the proposed alignment. The wetland, which is fed by an intermittent stream, provides limited habitat for birds and non-game animals and is not an important flood control or pollution abatement feature. Based on evaluations completed to date, there is no practicable alternative to the taking wetland at this location.

Field investigations identified one wetland area, located to the north of the proposed alignment of Kagy Boulevard, that will be impacted by construction of the project. Acquisition of a 90-foot-wide right-of-way corridor and subsequent roadway construction will take approximately 0.22 acres from the two-acre wetland area fed by an intermittent stream. Only the no-build alternative would leave the wetlands undisturbed. All other alternatives considered for Kagy Boulevard include design features such as boulevards, sidewalks, medians, curbs and gutters that will utilize the entire right-of-way corridor. Construction of the proposed project will require that the right-of-way be cleared and that minor amounts of fill be placed in the wetland area. The impact to the Kagy Boulevard wetland area resulting from project construction is not considered to be significant since the affected area possesses

few identified wetland values. As indicated in Part III, "Affected Environment", the wetland area provides only limited habitat for birds and non-game animals and is not an important flood control or pollution abatement feature due to its isolation from a major drainage. Since the marsh is located in a developing urban area and is small in size, the recreational value of the wetland is limited.

Due to the potential for urban development along Kagy Boulevard and the fact that right-of-way currently exists through a portion of the wetland area, few alternatives exist to the taking of wetland from this location. Realignment of the proposed roadway to avoid taking wetland is not practical because large amounts of the right-of-way corridor already have been dedicated and the roadway would have to be offset by approximately 40 feet to avoid taking any wetland. The resultant impacts of such an alignment shift would be greater than that originally proposed for Kagy Boulevard since substantially more right-of-way would be required from the area immediately south of the wetland area. Since Kagy Boulevard is expected to have a design year ADT of 10,000-15,000, it is desirable to provide adequate travel lanes, shoulders, and a median with turn bays to ensure the effective operation of the facility.

Culverts and minor amounts of fill will be utilized to cross the affected wetland area. The installation of culverts will provide for intermittent stream flows and will allow the wetland area to maintain its erosion control function in the immediate project area. Based on the evaluations completed to date, there is no practicable alternative to taking a minor amount of the wetland located adjacent to the proposed Kagy Boulevard alignment. Measures to mitigate impacts of construction located in wetlands are discussed in Part VI: Mitigating Measures of this document.

4. Wetlands Finding

In accordance with Executive Order 11990, "Protection of Wetlands", (Federal Register, Vol. 42, No. 101, page 26961, May 25, 1977), alternatives to avoid impacts on wetlands were investigated. The 0.22 acre wetland area that will be affected by the proposed improvement of Kagy Boulevard is not considered to be important wildlife habitat and is not an important flood control, pollution abatement, or recreational area. The impacts that are expected to occur will not significantly affect the characteristics of a larger wetland area located north of the proposed right-of-way corridor. Alternatives to avoid the wetlands, such as realignment of the roadway, are not practicable due to existing or planned urban uses in the area. Realignment would require significantly more right-of-way acquisition and would result in a greater expense of limited public funds.

The design features of the preferred alternative for Kagy Boulevard will utilize the entire 90-foot-wide right-of-way corridor. The design features of the roadway and the developing urban nature of the project area will not allow the

creation of new wetlands or the enhancement of existing wetlands within the highway right-of-way limits.

The wetland area directly affected by the proposed action is the riparian zone adjacent to the intermittent drainage that supplies a marsh area north of the project. Since disruption of flows in the intermittent stream would damage the wetland, mitigation efforts will be focused on measures to avoid draining the wetland. All culverts and drainage facilities will be installed at elevations that will maintain the intermittent stream flows. Provisions will be included to establish strict construction limits in the vicinity of the drainage and to promptly revegetate those areas disturbed by roadway construction. Intermittent stream flows will be accommodated throughout the construction phase of the project.

Based upon the above considerations, it is determined that there is no practicable alternative to the proposed new construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

D. Human Environment

1. Socio-Economics

a. Population

Summary of Impacts

The population of Bozeman and Gallatin County is expected to slowly, but steadily increase through the design year. Much of this population growth may ultimately reside in outlying areas of the community that will be served by the proposed traffic facilities. Population projections indicate that approximately 20% of the anticipated growth in Bozeman and its surrounding area may occur within the immediate project areas. No specific socioethnic groups are expected to be directly or significantly affected by the proposed actions.

Population growth in Gallatin County and Bozeman is directly related to the economic climate of the area. Based upon the assumptions that enrollments at MSU will remain stable or continue to grow slightly and related wages will increase; that the tourist industry will remain strong and grow from the natural attractions of the area; and that light manufacturing will be a small but stable contributor to the local economy, the population of both Gallatin County and Bozeman is projected to increase steadily through the foreseeable future. The Bozeman Area Master Plan projects an annual average growth rate for Bozeman and its jurisdictional area of 2.7% through the year 2000. A continuation of this growth rate to the design year 2008 will be assumed for the purposes of this study. Therefore, the populations of Bozeman and its jurisdictional area in the design year are projected to be 38,000 and 10,500, respectively.

b. Project Area Population

Construction of the roadways will undoubtedly accelerate growth in areas served by the proposed projects, particularly in the North 19th Avenue - Oak Street area where several proposals for mobile home and/or residential development are located. Owners of most of the vacant lands along this project corridor have submitted annexation, development or rezoning proposals within the last five years in anticipation of growth and roadway development. Given the higher density residential zoning designations, the amount of vacant land available, and

the current proposals by landowners, it is assumed that population within both project areas will increase at a higher annual average rate than Bozeman's jurisdictional area population. If a significant portion of this growth occurs on currently vacant lands along either project corridor, a conservative growth rate for the project areas would be five to ten percent per year. The North 19th Avenue - Oak Street area currently has more vacant land available than the Kagy Boulevard area and has pending proposals for annexation and development of several large parcels. Therefore, a ten percent average annual growth projection is used for this area while a five percent annual projection is used for the Kagy area. This growth scenario appears to be reasonable since Bozeman is projected to experience slow, but continued growth and development of lands adjacent to each project is largely dependent upon the access improvements afforded by the proposed roadways.

There are currently about 100 dwelling units, housing approximately 240 people, within the North 19th Avenue - Oak Street project area. Assuming an average annual growth rate of ten percent, the project area could be expected to accommodate an additional 550 residents by the design year. Currently 105 dwelling units, housing an estimated 250 people, are located in the Kagy Boulevard project area. Application of a five percent annual average growth rate to the estimated 1985 population of the area yields a design year population of 540 persons. Given these population projections, the North 19th Avenue - Oak Street and Kagy Boulevard project areas are expected to account for approximately 20% of the anticipated growth in the Bozeman jurisdictional area by the year 2008.

c. Demography

Construction of the roadways is not expected to directly or significantly affect current demographic distributions of age, persons at below property level, sex, race or handicapped persons within the study area. Recent census data indicates that there are no known concentrations of elderly, handicapped or minority residents within either project area. However, 1980 census data for Enumeration District 9904, located to the north of Kagy Boulevard (see Figure 10), suggests that 81% of the households (61 persons) were below 80% of the median county income level. Given the relatively young average age of residents of the district and its proximity to Montana State University, this income characteristic is most likely due to a high student population.

d. Housing

Project development is not likely to change the mix of future housing in either study area. Approximately 335 housing units would be required to accommodate the projected population increases for both project areas by the year 2008. Several landowners in the North 19th Avenue - Oak Street area have proposed additional mobile home and higher density residential development for the area that are consistent with planned and

Summary of Impacts

The proposed improvement projects will require one residential relocation and the acquisition of lands adjacent to the proposed roadways for rights-of-way. Residential development in the project areas, particularly in the North 19th Avenue - Oak Street area, is contingent upon the provision of access. Sufficient properties exist to accommodate future housing needs in the project areas.

permitted land uses. If developed, these proposals will provide residential units of varying types and densities and will easily accommodate the anticipated population increase in the project area. Future housing development in the Kagy Boulevard area is limited somewhat by the large amount of University-owned land and established single-family residential areas at the west end of the project area. Additional residential development along Kagy Boulevard is likely to occur between South 11th Avenue and Willow Way where expansion of an existing apartment complex is proposed.

e. Land Use

The North 19th Avenue - Oak Street project area is currently undergoing a transition from rural residential and mixed land uses to a medium density residential neighborhood. With the exception of the University, the Kagy Boulevard area is generally recognized as mixed use residential area that has become more densely developed in recent years. The area currently has an apartment complex and multiple use proposals pending the installation of roads and public services. The construction of the proposed roadways will accelerate growth in the project study areas, particularly since it will access parcels of North 19th Avenue - Oak Street that currently lack such provisions. This provision of access will change the character of both existing neighborhoods from semi-rural to urban over the next ten years.

Summary of Impacts

Both project areas are undergoing a transition from rural residential areas to more densely developed residential areas. Three major development plans for the North 19th Avenue - Oak Street area propose to convert existing agricultural lands to medium density residential and commercial-office uses. Provision of access is prerequisite to the development of the area. Future development in the Kagy Boulevard project area is limited somewhat by large University land holdings; however, development of apartments or neighborhood commercial centers is likely on private lands adjacent to MSU. Increased traffic resulting from the completion of substantial portions of the perimeter arterial system may stimulate commercial development in locations where such uses are permitted. Development in the project areas will require the extension of city services upon annexation.

Some of the acreage adjacent to the proposed roadways is currently in agricultural use, both pasture and cropland. The SCS District Conservationist in Gallatin County was contacted in order to assess any possible impacts on prime, unique or important farmlands. It was the District Conservationist's opinion that much of the agricultural lands within the area adjacent to the roadways could be considered prime farmlands. However, because these lands have all been designated for future urban growth and included within the city sewer service area, the impact on Gallatin County agriculture does not appear to be significant.[14] Since the agricultural lands within the study area are committed to urban development, this property does not fit the definition of farmland contained in the Farmlands Policy Protection Act. Therefore, these agricultural lands are not subject to the provisions of the Act.

[14] Nadwornick, SCS, in a personal communication February 25, 1985.

Since construction of the proposed projects will complete a major portion of a planned arterial route around the City of Bozeman, it is likely that local traffic patterns will change resulting in increased traffic volumes on some sections of the route. Increased traffic may stimulate commercial development along portions of 19th Avenue and Kagy Boulevard designated for general highway business and neighborhood commercial uses in the Bozeman Area Master Plan. The lands designated for light industrial uses between Oak Street and Baxter Lane may also begin to develop in response to completion of the perimeter arterial route.

The acquisition of right-of-way for North 19th Avenue - Oak Street and Kagy Boulevard is not expected to significantly alter the development of vacant lots adjacent to the proposed roadways. Right-of-way will be necessary from the lots fronting the east side of North 19th Avenue between Durston Road and Oak Street. The proposed right-of-way acquisition from the lots will not reduce the size of these lots below the minimum square footage required by the zoning district. Most of these lots are currently used as rear yards; however, since North 19th Avenue will be designed as a "limited access facility", access may have to be granted to assure developability of the lots because alternate access is not available. There are currently no structures along North 19th Avenue between Oak Street and Baxter Lane or along Oak Street between North 19th and North Ninth Avenues.

The required minimum front yard setback required by zoning in the Willow Way district along Kagy Boulevard is 35 feet. The proposed right-of-way acquisition will reduce the setback for one residence in the area to the minimum allowable distance. All other properties along this section of Kagy Boulevard will meet setback requirements for residential, public, and semi-public uses.

Photo 6
Looking eastward along the proposed alignment of Kagy Boulevard from the residential area near South 19th Avenue. Approximately 15 feet of right-of-way will be required from properties abutting either side of the roadway to supplement the existing right-of-way delineated by the fencelines in this photograph.

f. Relocation Impacts

Summary of Impacts
Right-of-way corridors sufficient to accommodate four-lane roadways will be acquired for all build alternatives. The right-of-way acquisitions will require one residential relocation from the Kagy Boulevard area and the relocation of one business located near the intersection of Oak Street and North Seventh Avenue. No minority or disadvantaged groups will be impacted by these relocations. Relocation assistance for the property owners displaced by the project will be provided by MDOH.

The proposed improvements to North 19th Avenue and Oak Street will require the acquisition of either a 100-foot-wide or 116-foot-wide right-of-way corridor between Durston Road and North Seventh Avenue. The City of Bozeman already owns a parcel at the northeast corner of the Durston Road - North 19th Avenue intersection; however, an additional 20 to 28 feet of right-of-way will be required from the east side of the proposed alignment from the city-owned lot to the Covered Wagon Mobile Home Park. The developer of the large parcel adjacent to the west side of North 19th Avenue has dedicated the right-of-way

required for the project as a condition of annexation into the city. Construction of Alternative 3, which requires 116 feet of right-of-way, would require the acquisition of right-of-way beyond that already dedicated by the owner and would take the residence at the northeast corner of Durston Road and North 19th Avenue. The development of Oak Street will require right-of-way acquisition from North 19th Avenue to west of North Ninth Avenue. It is likely that the developer of much of the properties along the north side of Oak Street will be required to dedicate right-of-way as a condition of annexation; but significant right-of-way acquisitions will still be necessary over much of the length of Oak Street. Minor amounts of right-of-way will be required to augment existing right-of-way in the area immediately west of North Seventh Avenue.

The proposed right-of-way acquisition for Oak Street will require the relocation of the "Quik-Lube" located at the northeast corner of Oak Street and North Seventh Avenue. The owners of this business are aware of the proposed project and have been assured they would have adequate time for relocation prior to road construction. The owners of the business will be eligible to receive business relocation assistance from the Department of Highways. No other consultation was made with the business or advisory services since this is a minor business relocation and can be accomplished without undue delay prior to construction. No minorities or disadvantaged persons will be affected by the proposed right-of-way acquisition or relocation.

Photo 7
Looking westerly along the proposed Oak Street alignment at its intersection with North 7th Avenue. The construction of Oak Street will require the relocation of the "Quik Lube" business.

Construction of Kagy Boulevard will require that additional amounts of right-of-way be acquired to the west of South 11th to complete a 90-foot-wide corridor to South 19th Avenue. Varying amounts of right-of-way have been dedicated in the past, and minor amounts will be required from either and/or both sides of the proposed alignment of Kagy Boulevard. The proposed project will require one residential relocation from the area, and no minority groups will be affected. The removal of this residence is necessary to accommodate the proposed roadway improvements and to allow for the construction of a

properly aligned "T" intersection at Kagy Boulevard and Willow Way. The owners of the home have attended public meetings on the project and are aware of the possible impacts of roadway development.

Based on recent real estate sale information in the Bozeman area, there are adequate opportunities to find replacement housing. In the remote case that comparable housing is not available at the time of relocation, the Department of Highways is committed to finding "housing of last resort" or suitable housing even if the cost of available housing is slightly higher.

Photo 8
Right-of-way acquisition and construction of Kagy Boulevard will require one residential relocation. This residence, located in the trees at the right of the photograph, must be relocated to allow for the construction of a safe "T" intersection at Willow Way and Kagy Boulevard.

The Department's Relocation Assistance Program requires a 90-day notice to residents and landowners displaced by project development and provides for moving expenses and replacement housing assistance. If the Department and the landowner do not reach mutual agreement regarding the adequacy of compensation, a condemnation proceeding will determine the compensation. Mitigation for relocation impacts is also discussed in Part VI: Mitigating Measures of this document.

g. Economic Impacts

1) ECONOMIC BASE

The proposed improvements will not have notable economic impacts on the Bozeman area economy. There will be beneficial short-term employment impacts and a minor shift in business locations in the long-term to serve growing populations along project corridors. The proposed actions will result in only one business displacement, which is expected to relocate within the urban area.

2) COMMERCIAL DEVELOPMENT

Currently, very little commercial development exists within either the North 19th Avenue - Oak Street or Kagy Boulevard project areas. The notable exception is an area to the west of the intersection of Oak Street and North Seventh Avenue where the "Quik-Lube", a small service station and car wash, and the Topper Motel and Restaurant are located. Two other motel complexes are located just north of the project area. North Seventh Avenue in the vicinity of Oak Street is developed as a commercial strip. As previously mentioned, the "Quik-Lube", located adjacent to Oak Street and North Seventh Avenue, will be displaced by the proposed construction of Oak Street. The KXXL radio station is the only commercial use in the Kagy Boulevard project area and will not be affected by the proposed actions. A movie theatre and small neighborhood commercial area are located north of Kagy Boulevard at the southern edge of the University.

Additional development will probably be attracted to commercially zoned land along the perimeter arterial road system due to increased traffic volumes and improved traffic flows. The increase in commercial activity would improve property incomes and business employment along the corridor, a secondary beneficial impact of the proposed projects. Given the current land use patterns and the relatively small amount of property in the project areas that is currently zoned, the location of commercial enterprises along the North 19th Avenue - Oak Street or Kagy Boulevard corridors is not expected to cause significant reductions in the levels of commercial activity elsewhere in the Bozeman urban areas.

3) LOCAL EMPLOYMENT AND INCOME

Business and office expansion along these arterial routes will provide proprietor income, moderate employment opportunities, and will allow local landowners to benefit directly from land sales. However, these beneficial impacts are not likely to have a significant effect on overall employment and income in the Bozeman area.

4) PROPERTY VALUES

None of the realtors interviewed for this project had observed significant changes in property values due to the construction of the previous roadway improvement projects. The realtors concurred that the proposed improvements might encourage growth in the area but would not significantly affect property values. Appraisers for the Montana Department of Highways indicated that in the North 19th Avenue - Oak Street area there was a potential for slight increase in land value due to the provision of primary access to an undeveloped area. MDOH appraisers also projected a slight increase in values for properties zoned for commercial and/or office uses along the project corridor as the arterial route around Bozeman becomes established. The recent completion of an office building adjacent to the newly-constructed portion of Kagy Boulevard is

Summary of Impacts

The proposed projects will result in few long-term economic impacts to the Bozeman area. It is likely that the community will experience a slight shift in the location of businesses in response to the completion of the perimeter arterial route. Property values adjacent to the project corridors are likely to increase slightly due to the improved access and development potential. Additional commercial development along the project corridors will produce long-term employment and income benefits to the community.

indicative of the effect that improved access has upon commercial development.

5) PROPERTY TAX REVENUES

One residential structure and one commercial structure, property improvements, and portions of lots acquired for road right-of-way will be converted from private to public ownership. This will remove such real property from the Bozeman area tax base; however, these losses are expected to be realized only in the short-term. Over time, increases in commercial and residential land uses along the project corridor will result in a net gain in local property tax revenues.

A series of assumptions was made to facilitate the estimation of initial tax losses to local government. Although local governments develop estimates of "market values" to determine taxable values, these figures are variable by land use and difficult to interpret. In addition, the County estimates are for total ownerships and isolating the market values for a small portion of property needed for right-of-way is difficult. Since the MDOH Right-of-Way Bureau prepared similar estimates for all properties affected by the proposed actions, "MDOH market values" rather than the County's will be used to compute tax revenue losses. Market value estimates for the project areas are further complicated since some properties are currently assessed as agricultural lands and/or lie within a county rather than city school district. Therefore, it is assumed that over the next ten years county lands adjacent to the city will gradually be annexed. Further, it is assumed that lands along North 19th Avenue between Oak Street and Baxter Lane will steadily be converted to more intensive uses and will no longer be assessed at lower agricultural rates, even if annexation does not occur.

The total market value estimate of the affected properties and improvements is $440,000. The taxable value is, therefore, estimated to be approximately $37,600. Applying current mill levies, the total short-term negative effect on state, county, and special district tax revenues would be $7,600. It is estimated that each taxing entity would lose the following taxes annually, assuming that half of the acquired right-of-way would remain in the county five years from now:

County and City	$2,800
State University System	$ 225
School District 7C	$3,500
School District 7R	$3,500
General High Schools	$1,200

In addition to the previously identified tax impacts, some rural fire districts may experience negative effects as district lands gradually become portions of the city. Tax revenue losses are expected to be short-term since projected increases in commercial land uses and residential densities within the project corridors will ultimately produce a net increase in local property tax revenues.

2. Transportation Systems

Summary of Impacts
The project will have little or no impact on other transportation modes in the Bozeman area.

Improvement of North 19th Avenue - Oak Street and Kagy Boulevard will complete a significant portion of a planned arterial route around the perimeter of Bozeman. Construction of these projects is consistent with local transportation planning for the Bozeman urban area and will help alleviate congestion on other city routes, particularly at several major intersections on North Seventh Avenue and West Main Street. All roadway construction alternatives will provide safe and efficient routes for local and through traffic. Documentation of these expected beneficial traffic impacts by alternative are included in subsequent sections.

Construction of the proposed projects will have little impact upon air, rail or inter-city bus transportation. Bozeman currently lacks any local commuter bus service; however, if such service is established in the future, it is likely that North 19th Avenue, Oak Street, and Kagy Boulevard would be important routes on a mass transit system.

3. Traffic

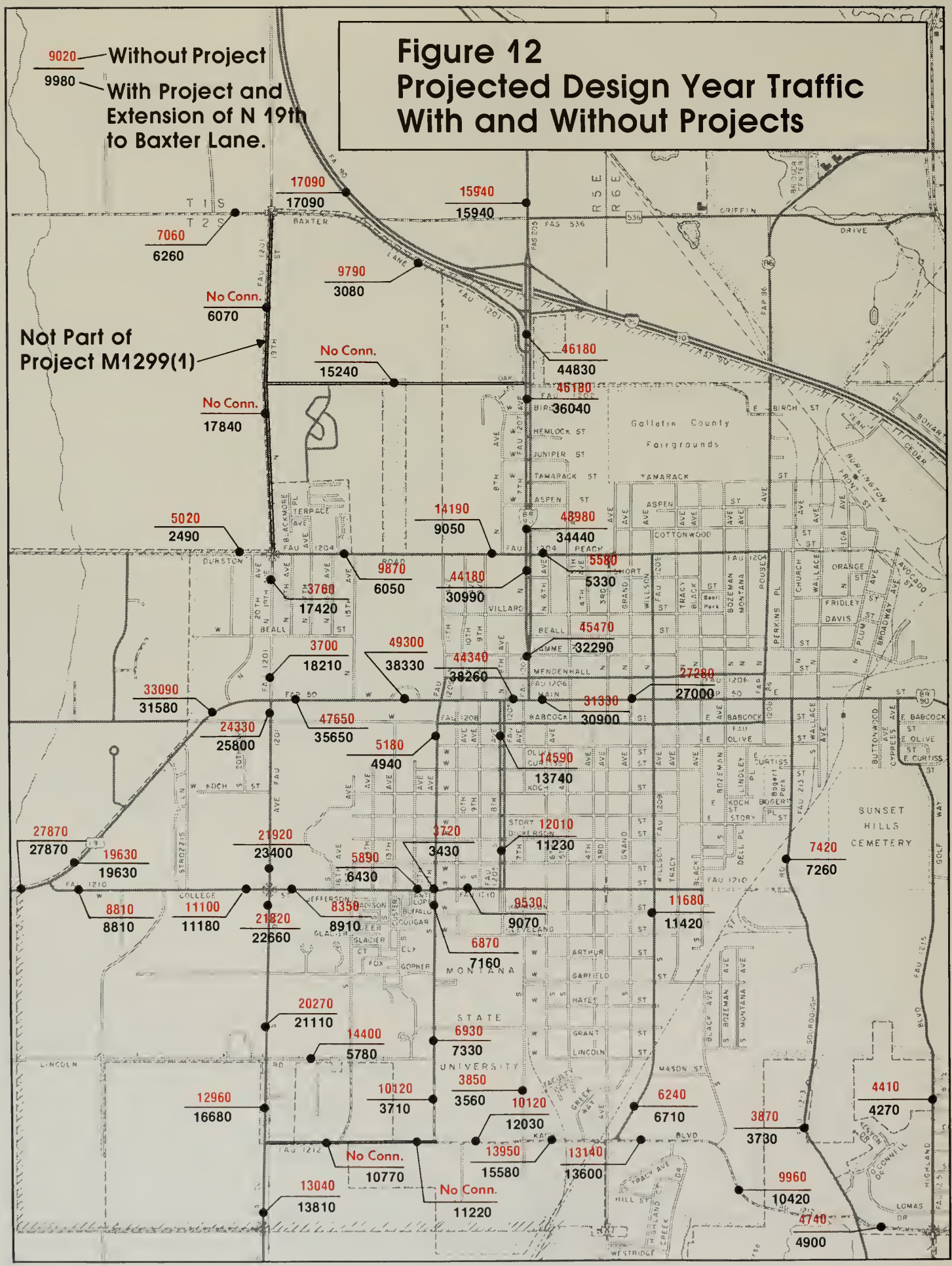
a. Traffic Projections

Due to the complexities of the major street network and travel demands, it is not practical to simply apply historical growth factors to existing traffic counts to yield future traffic volumes. Therefore, urban traffic projections are commonly developed through the use of computerized traffic assignment models. The model utilized for the purposes of this EIS was the "PLANPAC/BACKPAC" model developed by the Federal Highway Administration. This model is utilized by the Department of Highways to assess future traffic conditions in urban areas of Montana and was most recently employed to model traffic in the Bozeman Transportation Plan.[15] This model combines traffic generation parameters, such as population and employment, with travel characteristics in a number of traffic zones in the urban areas to estimate traffic volumes on the major street network. The projections of future socio-economic conditions and the traffic data which describes operational characteristics of the major street network are the primary model inputs necessary to project design year traffic. The inputs developed for the Bozeman Transportation Plan and utilized to model future traffic conditions represent a "worst case scenario" for the design year 2008.

15 "Bozeman Transportation Plan", pp. 23-37.

b. Traffic Impacts

Figure 12 contains the projected average daily traffic volumes on the major street network in the design year with and without the proposed projects. It is readily apparent from this comparative data that portions of several arterial streets will be significantly impacted if the proposed projects are not developed. Average daily traffic (ADT) on North Seventh Avenue and West Main Street may exceed 45,000 under this scenario. Traffic on Durston Road may have an ADT of15,000 by the


9020
9980
Without Project
With Project and Extension of N 19th to Baxter Lane.
Figure 12
Projected Design Year Traffic With and Without Projects
Not Part of Project M1299(1)
17090
17090
15940
15940
7060
6260
9790
3080
No Conn.
6070
No Conn.
15240
46180
44830
No Conn.
17840
45180
36040
5020
2490
14190
9050
48980
34440
9870
6050
44180
30990
5580
5330
3760
17420
45470
32290
3700
18210
49300
38330
44340
38260
27280
27000
33090
31580
31330
30900
24330
25800
47650
35650
5180
4940
14590
13740
27870
27870
21920
23400
5720
3430
12010
11230
19630
19630
5890
6430
7420
7260
8810
8810
11100
11180
21820
22660
8350
8910
9530
9070
11680
11420
6870
7160
20270
21110
14400
5780
6930
7330
12960
16680
10120
3710
3850
3560
10120
12030
6240
6710
4410
4270
3870
3730
No Conn.
10770
13950
15580
13140
13600
13040
13810
No Conn.
11220
9960
10420
4740
4900
Gallatin County Fairgrounds
SUNSET HILLS CEMETERY
MONTANA STATE UNIVERSITY

design year if the projects are not constructed. It should be noted that the traffic model does not recognize capacity restrictions and the existing facilities may not be capable of handling the projected design year traffic without significant modifications.

It is evident from the traffic projections shown in the figure that the proposed projects will provide traffic relief to a number of arterials in the project areas. Installation of the projects, primarily Project M1299(1), will result in a net shift of approximately 10,000 vehicles per day from North Seventh Avenue and West Main Street to the North 19th Avenue - Oak Street corridor. Durston Road traffic volumes are expected to stabilize at present levels with construction of the projects. It was also assumed for modeling purposes that North 19th Avenue would be extended from Oak Street to Baxter Lane by the design year. This connection will provide substantial traffic relief on Baxter Lane, particularly at its intersection with North Seventh Avenue and may reroute as many as 6,000 vehicles to North 19th Avenue - Oak Street each day.

The completion of Project M1212(4) between South 19th and South 11th Avenues will make Kagy Boulevard a more attractive access to MSU and will provide significant traffic relief to Lincoln Road. The arterial continuity provided by the project will result in average daily traffic increases of about 2,000 vehicles on South 19th Avenue and the existing sections of Kagy Boulevard. The project is expected to have little effect on West College Street traffic.

Figure 13 depicts the year 2008 average daily traffic volumes for major streets in the project areas with the proposed projects and the construction of an I-90 interchange and connection to North 19th Avenue. This scenario has been included with the EIS evaluations because the Bozeman PCC selected the North 19th Avenue area as the most desirable location for the construction of a future interchange.[16] An interchange at this location would reduce traffic on North Seventh Avenue and increase the usage of North 19th Avenue south of Oak Street by 2,000 vehicles per day. North 19th Avenue between the interchange and Baxter Lane would have an ADT of approximately 7,000 in the design year. The traffic volumes on Oak Street between North 19th and North Seventh Avenues are projected to decrease slightly if an interchange were in place. Baxter Lane between North 19th and North Seventh Avenues would also experience traffic decreases with this scenario. The effects of an interchange would be minimal on Kagy Boulevard and other streets in the southwest portion of Bozeman.

It should be noted that traffic resulting from the completion of the FAS 235 (East Valley Center Drive) from Jackrabbit Lane, south of Belgrade, to North 19th Avenue at Baxter Lane was not included in the projections due to limitations in the modeling process. The construction of the project is likely to decrease traffic on I-90 and North Seventh Avenue. It is estimated that 6,500 vehicles could potentially enter the Bozeman urban street network each day at North 19th Avenue and

Summary of Impacts

Traffic projections indicate several major streets in Bozeman may be severely impacted if the proposed projects are not constructed. Traffic on North Seventh Avenue and West Main Street are projected to exceed 45,000 VPD. Traffic on Durston Road may approach 15,000 VPD without the projects. Construction of the proposed projects, particularly the North 19th Avenue - Oak Street project, will result in a net shift of approximately 10,000 VPD from North Seventh Avenue and West Main Street to the new arterial route. Durston Road trafic is projected to stablize at present levels with the projects. The extension of North 19th Avenue to Baxter Lane may reroute as many as 6,000 VPD from Baxter Lane to North 19th and will provide substantial traffic relief at the intersection of Baxter Lane and North Seventh Avenue. Construction of an additional I-90 interchange at North 19th would provide a desirable connection and further reduce traffic on North Seventh Avenue.

[16] Formal motion by PCC at its June 25, 1985 meeting.

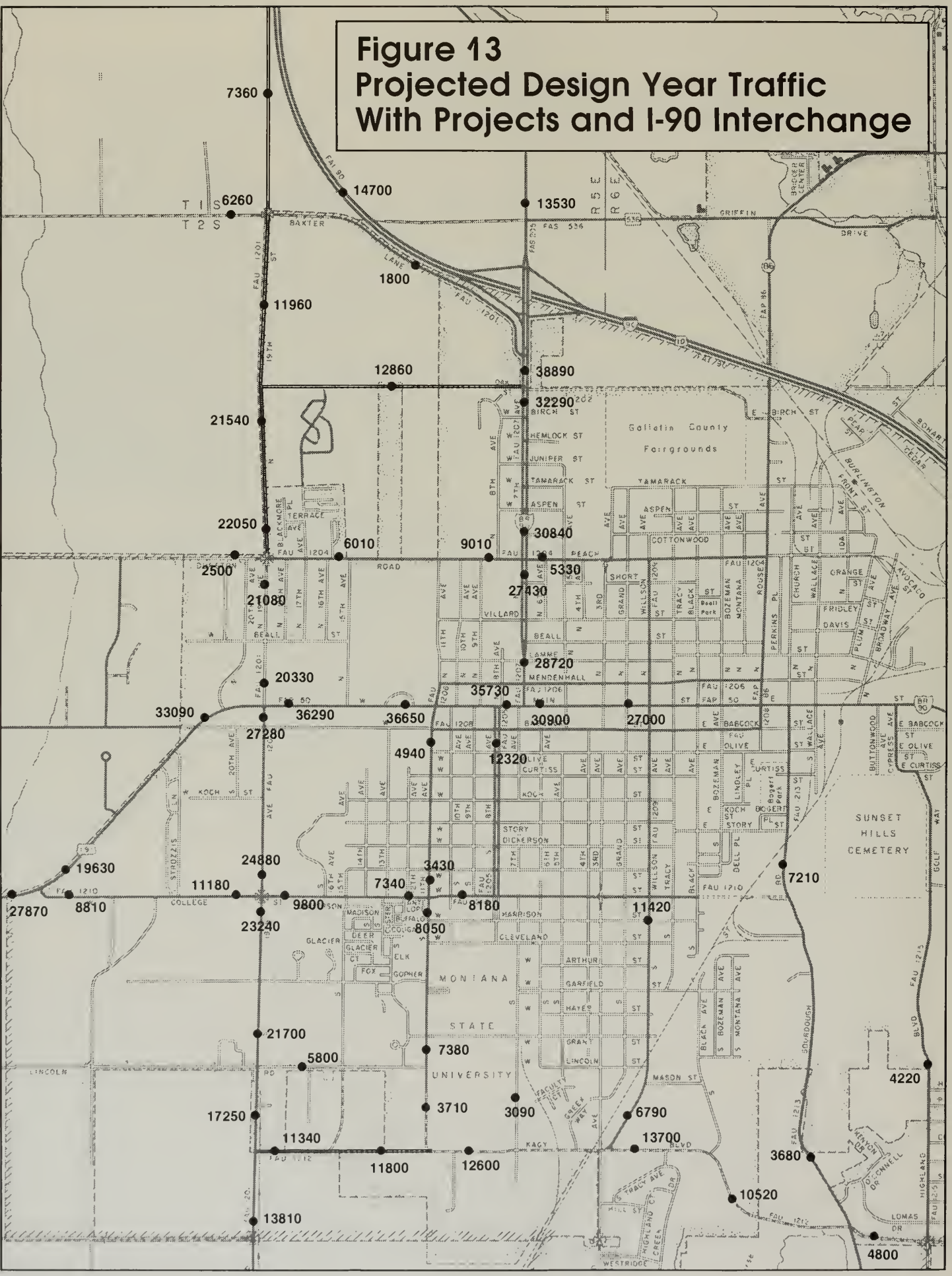


Figure 13
Projected Design Year Traffic
With Projects and I-90 Interchange
7360
6260
14700
13530
1800
11960
12860
38890
32290
21540
22050
6010
9010
30840
2500
5330
27430
21080
20330
28720
35730
33090
36290
36650
30900
27000
27280
4940
12320
19630
24880
3430
11180
7340
8180
11420
27870
8810
9800
7210
23240
8050
21700
5800
7380
17250
3710
3090
6790
11340
11800
12600
13700
3680
4220
10520
13810
4800
Gallatin County Fairgrounds
SUNSET HILLS CEMETERY
MONTANA STATE UNIVERSITY
T 1 S
T 2 S
R 5 E
R 6 E

Baxter Lane and could contribute some 2,000 to 4,000 vehicles per day to the North 19th - Oak Street corridor.

c. Signalization Requirements

Major intersections along the project corridors were evaluated to determine locations where signalization will be required during the design life of the facilities. The Manual on Uniform Traffic Control Devices (MUTCD) outlines 11 conditions that are indicative of the need for traffic signalization at a given intersection.[17] MUTCD requires that one or more of the signal warrants be met before traffic signal installation is justified. Warrant 1 "Minimum Vehicular Volume" and Warrant 2 "Interruption of Continuous Traffic" are directly related to traffic volumes. The traffic projections for each project corridor were evaluated relative to the warrants to determine if and when signalization will be required at a particular intersection.

[17] "Manual on Uniform Traffic Control Devices", US DOT, Federal Highway Administration, 1978.

The results of this analysis indicate that the intersection of Oak Street and North Seventh Avenue will meet the warrant requirements immediately upon construction of Oak Street. Volume warrants will not be met at the South 19th Avenue - Kagy Boulevard intersection prior to 1994. The intersections located at North 19th Avenue - Oak Street, Durston Road - North 19th Avenue and at Kagy Boulevard - Willson Avenue will meet volume warrants no earlier than 1995. Traffic volumes at two Kagy Boulevard intersections (at South 11th and South Seventh Avenues) will not satisfy the warrants until the year 2007. It should be noted that a "systems warrant" could be satisfied at Kagy Boulevard and South 11th Avenue early in the design life of the project if side street traffic conflicts become intolerable or undesirable. Minor intersections within the project areas were also evaluated in the analysis; however, none will require signalization by the design year 2008.

d. Facility Requirements

The measure by which a particular highway fulfills its function of carrying traffic is determined by a capacity analysis that establishes the level of service at which the highway operates. The capacity of a facility is defined as "the maximum hourly rate at which vehicles or persons can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic and control conditions." This description and analysis procedures utilized for the EIS evaluations are contained in the Highway Capacity Manual.[18]

[18] "Highway Capacity Manual", Special Report 209. Transportation Research Board, National Research Council, Washington D.C., 1984, p. 1-3.

The capacity or effectiveness of an urban roadway is dependent upon the efficient operations of its intersections. The effectiveness of individual intersections may be assessed in terms of level of service criteria which are based on delays and reserve capacity. Levels of service for unsignalized intersections are defined by reserve capacity; whereas, the levels of service for signalized intersections are defined in terms of average stopped delay time. Level of service criteria are designated from A through F (with A being the best and F being

the worst) to cover the full range of traffic operating conditions. The criteria is utilized to evaluate the operation of individual lane groups on each approach to an intersection.

The capacity of an intersection approach is the maximum number of vehicles that can pass through a given intersection approach over a given time period. Reserve capacity may be determined by comparing actual approach flow rates with the capacity flow rates. Reserve capacity on a particular approach would be the unused portion of the capacity flow rate (i.e., an approach volume that is 70% of capacity would have a reserve capacity of 30%).

Three intersections in the North 19th Avenue - Oak Street project area (Oak/North Seventh, North 19th/Oak, and North 19th/Durston Road) and four in the Kagy Boulevard project area (South 19th/Kagy, Kagy/South 11th, Kagy/South Seventh, and Kagy/Willson) will require signalization prior to the design year. The operation of these intersections and the associated levels of service will determine the traffic carrying capacity of North 19th Avenue, Oak Street, and Kagy Boulevard. The levels of service criteria associated with average stopped delays for signalized intersections are summarized in Table No. 9.

Table No. 9

Level of Service Criteria for Signalized Intersections [19]

Level of Service	Avg. Stopped Delay Per Vehicle (Sec.)
A	less than 5.0
B	5.1 - 15.0
C	15.1 - 25.0
D	25.1 - 40.0
E	40.1 - 60.0
F	more than 60.0

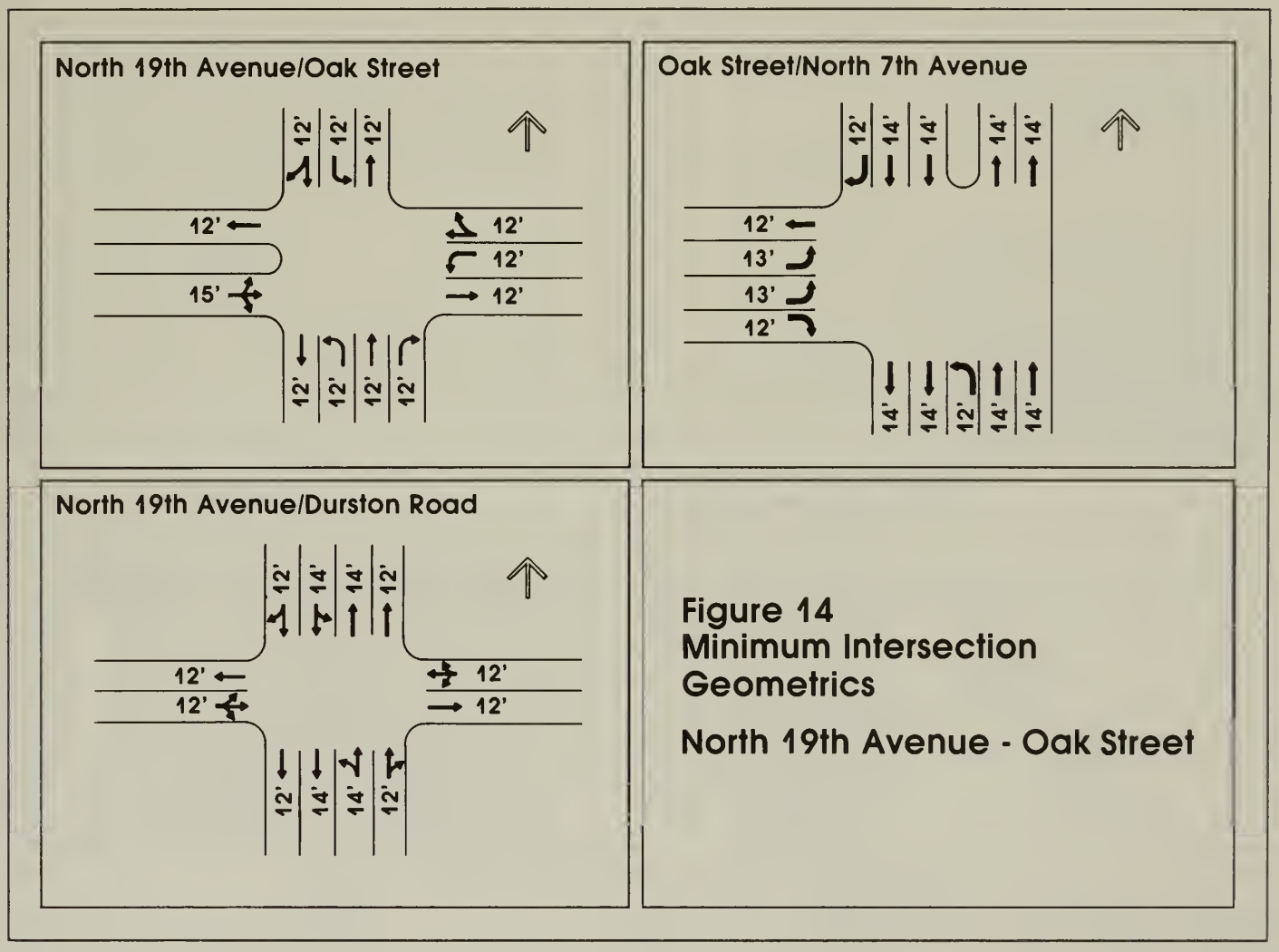
19 "Highway Capacity Manual", p. 9-4.

All major intersections within the project corridors were evaluated to determine the intersection geometrics required to provide a Level of Service C and a reserve capacity of approximately 20-25% in the design year, as typically required by MDOH for urban arterial streets. The capacity analysis conducted for this EIS identified the minimum number of approach lanes and the required lane usage for each approach at the major intersections. The resulting minimum intersection geometrics are depicted schematically in Figures 14 and 15. These minimum intersection configurations were developed for each alternative and were utilized for preliminary design layouts for each alternative.

1) NORTH 19TH AVENUE - OAK STREET

It should be noted that several assumptions were required for the sizing of North 19th Avenue and Oak Street. It was assumed the intersection at North 19th Avenue - Oak Street will be a standard four-way intersection in the design year. Based on this assumption, Oak Street would be extended to the west to serve as a primary access point to the Annie Subdivision and

North 19th Avenue would be extended northward to Baxter Lane. It is also possible that commercial or industrial uses may develop in the area east of North Seventh Avenue and between Oak Street and I-90. Since firm plans are not available regarding the type and size of such development, the Oak Street - North Seventh Avenue intersection was analyzed as a three-way intersection. Supplemental capacity analyses were completed to examine the traffic impacts of adding an east approach to the intersection. These analyses were not considered to be appropriate for inclusion in this document due to the preliminary nature of the development proposals; however, the information is on file with the Montana Department of Highways in Helena.



The approach configurations on North 19th Avenue at Durston Road and Oak Street (see Figure 14) require four traffic lanes. Approximately 1,200 feet of four-lane transition would be required to utilize an undivided two-lane design alternative. The transitions at each intersection would reduce the amount of intervening two-lane roadway to less than 300 feet in this half-mile long section of North 19th Avenue. The fact that design year traffic volumes (approximately 20,000 ADT) will require four travel lanes and that transitions would be necessary over most of the section between Durston Road and Oak Street limits the consideration of two-lane alternatives

Minimum Facility Requirements
North 19th Avenue (Durston Road to Oak Street). Four twelve foot wide travel lanes will be necessary to accommodate design year traffic volumes. Minor pavement widening will be required at the North 19th Avenue - Durston Road intersection. The existing section of North 19th, south of Durston Road, must be restriped as a four-lane facility to provide continuity between sections.

for North 19th Avenue. Therefore, installation of a four-lane facility is desirable to provide an acceptable level of service in the design year.

The analyses for North 19th Avenue between Oak Street and Baxter Lane indicate that an acceptable level of service can be provided by a two-lane roadway. The installation of a left-turn only lane on the north approach to the North 19th Avenue - Oak Street intersection is necessary to ensure efficient traffic operations in the design year.

Minimum Facility Requirements
North 19th Avenue (Oak Street to Baxter Lane) Two twelve-foot wide travel lanes will be necessary to accommodate design year traffic volumes on this road section. Minor pavement widening will be required on the north approach to the North 19th Avenue - Oak Street intersection to facilitate left turn movements onto Oak street.

The capacity analysis for Oak Street indicates design year traffic volumes may be accommodated by either two-lane or four-lane facilities. Installation of an undivided two-lane roadway on Oak Street would require intersection widening and transitions at North 19th and North Seventh Avenues and would provide only 1,700 feet of actual two-lane roadway. Although the two-lane alternatives would satisfy minimum facility requirements, left turn lanes would be necessary at all intersections to minimize delays and provide more efficient flow characteristics for through traffic. The four-lane roadway alternative for Oak Street would carry the projected traffic volumes more efficiently than the two-lane alternatives. A four-lane facility will provide passing availability which is desirable considering the grade change west of North Seventh Avenue and the likelihood of significant truck volumes on the facility. A four-lane facility on Oak Street will also provide design continuity between several arterial streets in northwest Bozeman that are either constructed as or easily converted to four-lane roadways with medians.

Minimum Facility Requirements
Oak Street (North 19th to North 7th Avenue). Two twelve-foot wide travel lanes with a twelve-foot wide median to accommodate left turn bays at all intersections are the minimum facility requirements for this section of roadway. A four-lane is recommended as the ultimate design for Oak Street since projected traffic volumes could be handled more effectively and in a safer manner. A four-lane facility would also maintain design continuity on local arterials.

Minor modifications to North Seventh Avenue in the vicinity of the Oak Street intersection will be necessary to accommodate design year traffic movements. As Figure 14 indicates, a right-turn lane must be provided on the north approach and a left-turn lane must be provided on the south approach to the intersection. Installation of the left-turn lane can easily be accomplished with modifications to the existing raised median configuration; however, additional construction will be necessary to install the right-turn lane. The existing right-of-way on North Seventh Avenue is sufficient to accommodate both modifications. Two left-turn lanes and one right-turn lane will be necessary by the design year to move traffic from Oak Street onto North Seventh Avenue.

2) KAGY BOULEVARD

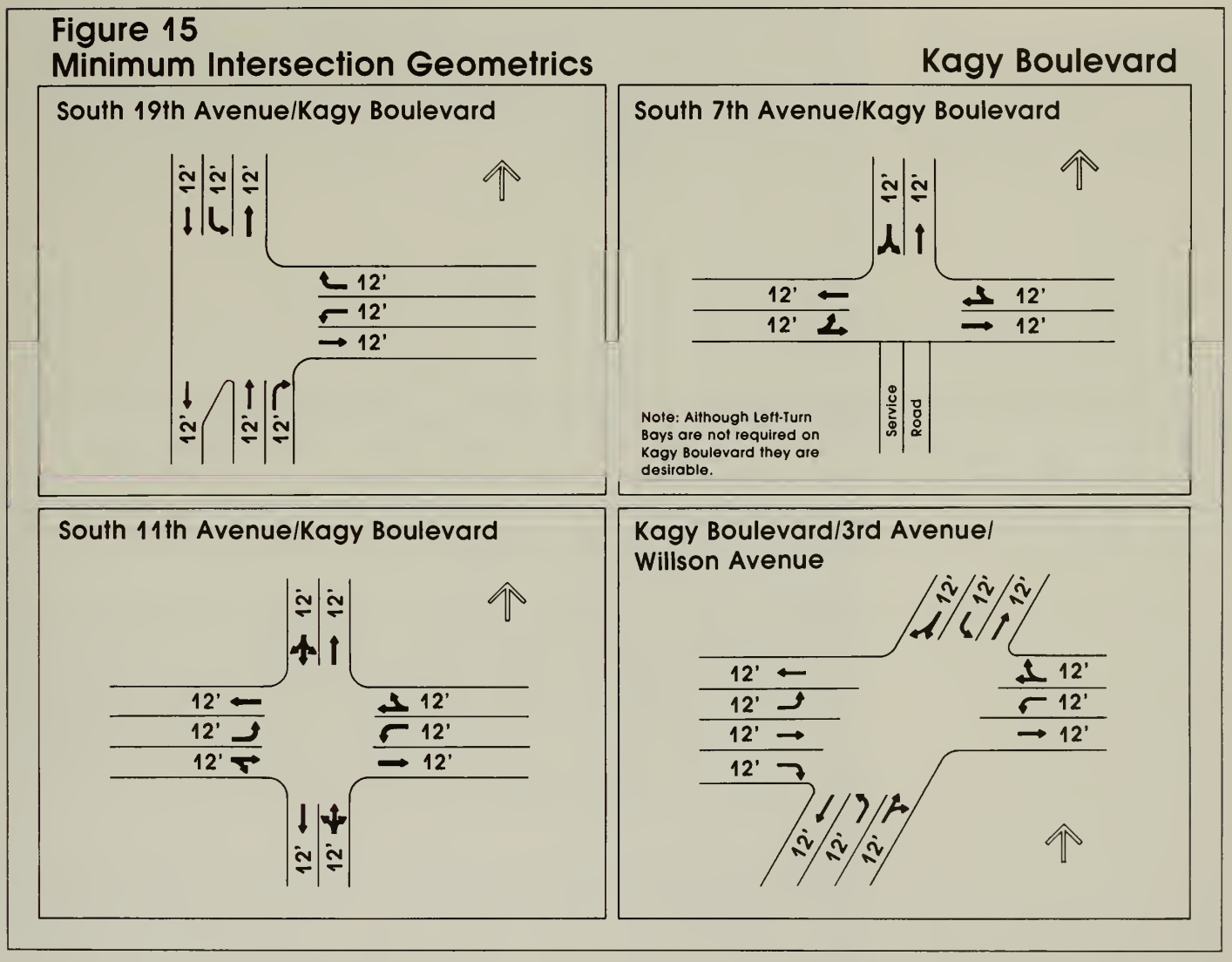
It was assumed for the purposes of sizing Kagy Boulevard that the existing intersection of Kagy Boulevard - South Third Avenue - Willson Avenue will be modified by the design year to a slightly skewed four-way intersection to accommodate projected traffic volumes and signalization requirements. The capacity analysis assumes Third Avenue, south of the intersection, would be realigned with the Willson Avenue approach and Third Avenue, north of the intersection, would be terminated. The resulting intersection and the minimum geometric requirements for this intersection are presented in Figure 15.

The capacity analysis for Kagy Boulevard indicates that future traffic volumes can be accommodated by a two-lane facility, only if left turn bays are provided at all intersections. Considering that average daily traffic may range from 10,000 to 15,000 vehicles by the design year, any left turn movements from the through lanes would produce unacceptable delays and congestion. Additional pavement widening will be required at the Kagy Boulevard - South Third/Willson Avenue intersection to accommodate a right turn lane on the west approach. Unlike the Oak Street corridor, the Kagy Boulevard project area has little grade change and is not expected to carry a high volume of truck traffic. Therefore, Kagy Boulevard will function effectively as a two-lane facility with left turn bays and access control provisions.

Minimum Facility Requirements

Kagy Boulevard (South 19th to South 3rd Avenue). The capacity analysis indicates that Kagy Boulevard can function effectively in the design year if two twelve-foot wide travel lanes and a twelve-foot wide median with left turn bays, at all intersections are provided. Minor pavement widening will be necessary at the Kagy Boulevard - Willson Avenue intersection to allow for the development of right-turn lanes.

Figure 15
Minimum Intersection Geometrics — **Kagy Boulevard**



e. Related System Impacts

The development of traffic facilities on North 19th Avenue - Oak Street and Kagy Boulevard is expected to stimulate the development of other related segments of the local road and street network. The construction of the projects will establish the basic transportation system framework in two

developing areas of the community. Discussions with local planning officials and developers have helped identify probable locations for the intersections of minor streets in both project areas. The completion of these arterial projects will require some modifications on connecting arterial streets to ensure efficient operation of the street network.

1) NORTH 19TH AVENUE - OAK STREET

Much of the North 19th Avenue - Oak Street project area is presently undeveloped; however, proposed developments west of North 19th Avenue and north of Oak Street are likely to establish collector streets in the project area. Access to the planned Annie Subdivision, located adjacent to North 19th Avenue, is proposed for Stevens and Oak Streets. Development proposals for the parcels north of Oak Street indicate that connecting streets are likely at North 17th, North 11th, and North Ninth Avenues. It is desirable to directly offset the north and south approaches at 17th Avenue to minimize traffic conflicts in the vicinity of the North 19th Avenue - Oak Street intersection.

The development of a north-south connection between Baxter Lane and Oak Street at 11th Avenue is viewed favorably by local officials. Construction of this link, which has been proposed as part of a private development in the area, is essential if traffic conflicts at the Baxter Lane - North Seventh Avenue intersection are to be minimized. The routing of traffic from Baxter Lane west of its intersection at North Seventh Avenue would produce a beneficial traffic impact. Baxter Lane traffic could be accommodated in a safer and more effective manner at the Oak Street - North Seventh intersection rather than at the Baxter Lane - North Seventh Avenue intersection. Intersection geometrics and the proximity to I-90 exit ramps result in hazardous operating characteristics at the existing intersection.

It should be noted that development of a four-lane roadway on North 19th Avenue will require that the existing two-lane section (Main Street to Durston Road) be restriped as a four-lane facility to function effectively and provide the desired continuity between projects. The pavement width of the existing section will easily accommodate four travel lanes and shoulders. The restriping should be completed prior to the completion of Project M1299(1).

The Covered Wagon Mobile Home Park, located to the southeast of the proposed North 19th Avenue - Oak Street intersection, has a perimeter roadway which parallels the north and west edges of the property. This roadway is essential to traffic circulation in the mobile home park and must be maintained as a "frontage" road when North 19th Avenue and Oak Street are developed. Approximately 20 feet will separate the frontage road from the proposed arterial street at Stevens Street and North 17th Avenue. A realignment of the frontage road in the vicinity of Stevens Street and North 17th Avenue may be necessary to minimize conflicts between ingress and egress traffic at these major access points. The following photograph depicts

the relationship between North 19th Avenue - Oak Street and the frontage road in the mobile home park.

Photo 9
View to the east along the proposed alignment of Oak Street from the adjacent Covered Wagon Mobile Home Park. The existing circulation road in the mobile home park will serve as a frontage road to Oak Street and North 19th Avenue. The circulation road will be separated from the arterial roadway by 20 feet.

2) KAGY BOULEVARD

The locations of minor streets along Kagy Boulevard have been predetermined by the existing development in the area. Intersections will be located at Willow Way, South 11th Avenue, South Seventh Avenue, and Greek Way. The reconstruction of Willow Way to a standard "tee" intersection is encouraged and should be facilitated by the acquisition and relocation of the residence located just east of the existing roadway. It is assumed that all other intersections would ultimately be constructed as four-way intersections. The Bozeman Area Master Plan indicates that South 11th Avenue, south of Kagy Boulevard, will ultimately be constructed as a collector street and would serve areas that will be developed with low to medium density residential uses. The administration of Montana State University has expressed a desire to relocate the primary access to the Museum of the Rockies from South Seventh Avenue to Greek Way. This relocation would require that Greek Way be extended southward from Kagy Boulevard to the museum. South Seventh Avenue, south of Kagy Boulevard, would remain at its present state and would function only as a service road to the museum and stadium areas. The closure of South 11th and South Seventh Avenues to through traffic within the campus, as proposed by MSU, would result in a minor redistribution of local traffic but is not expected to have a major effect on the ultimate development of Kagy Boulevard.

4. Pedestrian and Bicyclist Facilities

Since these projects are proposed for relatively undeveloped areas of Bozeman, no pedestrian and bicyclist facilities currently exist within the limits of the projects. All construction alternatives for North 19th Avenue, Oak Street, and

Summary of Impacts
All construction alternatives will provide pedestrian and bicyclist facilities where none presently exist. The provision of such facilities will be especially beneficial along Kagy Boulevard near MSU. Provisions for the handicapped will be included in the design of all intersections.

Kagy Boulevard include the provision of sidewalks for pedestrians and either shared roadway or separated bicycle facilities. One of the largest generators of pedestrian and bicyclist traffic in Bozeman is Montana State University since pedestrian or bicycle travel is the primary transportation mode for many students. The Bozeman Bicycle Route Plan identified Kagy Boulevard as a probable location for a bikeway. The provision of pedestrian/bicyclist facilities along Kagy Boulevard and North 19th Avenue - Oak Street is consistent with recently completed projects on adjacent portions of these routes.

Pedestrian crosswalks along Kagy Boulevard are desirable at South 19th, South 11th, and South Seventh Avenues. Additional pedestrian crossing facilities in the area of the stadium should be developed to facilitate pedestrian movement between parking areas. It is anticipated that crosswalks will ultimately be developed at North 19th - Durston Road, North 19th - Oak Street, and Oak Street - North Seventh Avenue. Wheelchair ramps must be provided at each of the crosswalk locations.

E. Cultural, Recreational, and Visual Environment

1. Archaeological and Historical

Summary of Impacts
The Smith farm site, located at the northwest corner of the North 19th Avenue - Dustron Road intersection, was determined to be eligible for inclusion in the National Register. The right-of-way required for Alternatives 2, 4 and 5 would be within ten feet of the farmhouse structure. Right-of-way sufficient to accommodate Alternative 3 would require the removal of the farmhouse structure.

Each of the build alternatives for the proposed construction of North 19th Avenue will require additional right-of-way from the Smith farm site and will impact the Smith farmhouse, a locally significant structure eligible for listing in the National Register. Construction of Alternatives 2, 4, or 5, which utilize a 100-foot-wide right-of-way, will require the taking of a 30-foot-wide parcel from the site and will place the nearest travel lane approximately 21 to 41 feet from the farmhouse structure. In addition, fill material will be required on the north approach to match the existing roadway elevation of the North 19th Avenue - Durston Road intersection. Unless special construction or design modifications are utilized, the fill material may extend beyond the right-of-way and into the area currently occupied by the house. Alternative 3, which utilizes a 116-foot-wide right-of-way, requires that a 38-foot-wide strip be taken from the Smith property. This right-of-way acquisition would directly impact the farmhouse and requires its removal or relocation.

Noise studies conducted for the North 19th Avenue corridor indicate that exterior noise levels at the Smith farmhouse will exceed FHWA noise abatement criteria of 70 dBA for residential uses under design year traffic conditions for all build alternatives. The predicted noise levels for this site (see Test Location 6 in Figure 9 and Table No. 7) range from 72 to 73 dBA for the two-lane alternatives and from 71 to 72 dBA for the four-lane alternatives.

In conjuction with the right-of-way acquisition for all build alternatives, clearing activities will require that a row of cottonwood trees and a wrought-iron fence be removed from the

eastern edge of the Smith farm property. Impacts to the Smith farm are discussed in detail in Part V, "Section 4(f) Evaluation." Measures to mitigate impacts to the historical property are discussed in Part V and Part VI, "Mitigating Measures" of this document.

2. Recreational

Summary of Impacts

Construction of the projects will provide beneficial impacts to parklands and recreational areas through the provision of improved access. Access improvements and subsequent development in the Oak Street area may initiate development of North Ninth Avenue Park. Special events traffic at MSU will be facilitated by the completion of Kagy Boulevard.

The build alternatives will benefit parklands or recreational sites along each project corridor through the provision of improved access to the properties. The proposed improvements to Oak Street will provide much needed access to North Ninth Avenue Park, a 2.2 acre city-owned park. The park is currently undeveloped but will ultimately become a neighborhood park with limited picnic and play facilities. Increased access to this recreational property and further development of nearby vacant lands may hasten the development of North Ninth Avenue Park. The right-of-way required for the construction of Oak Street will not take any property from this public park.

The recreational facilities at Montana State University will be relatively unaffected by the proposed improvements to Kagy Boulevard. The existing 90-foot-wide right-of-way through the campus will not require any additional property from the intramural fields or from fieldhouse and stadium parking areas which are adjacent to Kagy Boulevard. The proposed project will improve traffic circulation through the MSU campus during special events at the fieldhouse and stadium by providing direct access to and from South 19th and Willson Avenues. This linkage with north-south arterial streets will improve traffic flows and help reduce congestion on streets within the campus and surrounding area.

The "no-build" alternatives for North 19th Avenue - Oak Street will result in continued difficult access to North Ninth Avenue Park. Selection of a similar alternative for Kagy Boulevard will have little affect upon the recreational facilities at MSU and will do little to resolve the conflicts typically experienced during special campus events.

No other significant impacts to the recreational resources of the area are anticipated as a result of the proposed roadway improvement projects.

3. Visual

Summary of Impacts

Loss of mature trees and right-of-way clearing will be the primary visual impact of the proposed projects. Residents in the Blackmore Place and Willow Way areas will experience the most significant changes in the visual environment.

Visual quality is one of the most complex environmental factors to analyze because it is dependent upon an individual's subjective assessment of the resource. The views of the new roadway from existing residential and commercial areas along each project corridor, as well as the perception of the roadways from the motorist's perspective, are relative points to consider in the overall assessment of visual impacts.

The primary visual quality impacts associated with any of the build alternatives will result from the acquisition and subsequent clearing of right-of-way from properties adjacent to the

proposed roadway alignments. In most instances, the loss of vegetation from the right-of-way required for the proposed improvement projects will not significantly alter the local visual environment. However, several landowners may lose trees or shrubs from areas adjacent to the proposed roadway alignment. The loss of several mature spruce and cottonwood trees from the Kagy Boulevard - Willow Way area will be the most significant visual resource impact of either improvement project.

The view of the road from existing developed areas will be a significant visual impact since the build alternatives will result in roadway construction through previously undeveloped areas or areas with minimal roadway facilities. Residents of the Blackmore Place area, east of North 19th Avenue, and in the Kagy Boulevard - Willow Way area will experience significant changes in views with any of the build alternatives. The clearing of vegetation from the rights-of-way and the traffic resulting from use of the roadways will affect local views and the semi-rural character of these residential areas.

F. Energy Evaluation

Summary of Impacts

The construction of high-design traffic facilities on North 19th Avenue, Oak Street and Kagy Boulevard is expected to result in a net energy savings since the savings in operational energy requirements would exceed the energy requirements of facility construction.

Transportation facilities and the operation of the facilities produce both direct and indirect energy consumption. Energy is directly consumed through the operations of the vehicles that utilize traffic facilities. Energy is indirectly consumed by the construction and maintenance of the facilities and the vehicles that utilize the facilities.

Evaluations of energy consumption indicate that the energy requirements for the construction alternatives are similar but greater than the requirements of the no-build alternatives. The energy required to construct the traffic facilities is the major reason for the difference in consumption between alternatives. If constructed, the operational energy requirements of the traffic facilities would be less than those required for the no-build alternatives. This is due to the operational benefits provided by a high-capacity facility design and a reduction in delays and congestion on other portions of the traffic network. The construction of traffic facilities on North 19th Avenue, Oak Street, and Kagy Boulevard is expected to yield a net energy savings, since the savings in operational energy requirements would exceed the energy requirements of facility construction.

G. Construction Impacts

Since the construction activities would involve extensive excavation and earthwork, potential impacts associated with the construction phase of each project must receive special consideration. The nature of the construction impacts will differ from those of a completed roadway. Since the existing resources and ecological systems can be disrupted by the nature of roadway construction activities, the resource categories

previously identified have been reviewed again from this perspective. Due to the fact that roadway construction techniques are relatively standardized, previous construction projects of a similar nature have been used as a basis for projecting road building activities and their potential resulting impacts.

A detailed discussion of these impacts is summarized herein. Measures to mitigate construction impacts are also discussed in Part VI, "Mitigating Measures" of this document.

1. Physical Environment

a. Geology and Soils

The most direct physical alteration of surface and subsurface materials would occur during the construction phase. The result of such construction activity would be the displacement and redistribution of existing soil and subsurface materials. The nature of the material likely to be encountered within the construction limits of the project may be easily excavated by power shovels or track-type tractors. Prior to excavation, topsoil would be stripped and stockpiled. At the conclusion of the construction activities, this topsoil will be replaced on disturbed areas and revegetation of these areas will be completed. The Montana Department of Highways specifications governing optimum moisture content and compaction of the original ground and embankment materials would assure that the roadway base would perform effectively over the service life of the facility.

As a result of these protective measures, no lasting adverse impact to the geology or soils of the area is expected.

Summary of Impacts

Construction impacts are typically limited in duration and restricted to localized areas of construction activity. Potential adverse impacts to the physical environment are mitigated effectively through proper construction techniques and strict enforcement of federal and state guidelines designed to protect the environment Adverse impacts resulting from construction of the North 19th Avenue - Oak Street and Kagy Boulevard proejcts will not be significant. Construction of the projects will result in some positive benefits to the Bozeman area economy due to the increased local employment opportunities and construction worker spending in the community.

b. Water Resources and Quality

1) SURFACE WATER RESOURCES

The major threat to surface water quality due to the construction phase of a new roadway project along the corridor would be the potential for sediment picked up by runoff from the construction site polluting watercourses. Such pollution involves primarily native soil particles and dissolved minerals. Suspended solids, typically clay particles, would be the major concern; of secondary interest would be soluble salts and minerals.

It is obvious that the larger the area disturbed by the highway construction, the greater the potential for pollution. In this regard, the alternatives would become progressively less favorable with increasing roadway widths and resultingly larger areas of disturbance.

The potential for surface water impacts from construction could be effectively mitigated by proper construction practices. The Montana Department of Highways Standard Specifications for Road and Bridge Construction contains provisions to

protect water quality during construction. Selected provisions of these specifications are reproduced in Table No.10.[20]

[20] "Standard Specifications for Road and Bridge Construction", adopted by Montana Department of Highways and Montana Highway Commission, 1981 Edition.

Table No. 10

Standard Erosion Control Practices

1. The Contractor shall submit to the Engineer for approval a program for effective control of water pollution.
2. The Contractor shall meet the requirements of the applicable regulations of the Department of Fish, Wildlife and Parks, Department of Health and Environmental Sciences, and all other state or federal regulations relating to the prevention or abatement of erosion, water pollution, and siltation.
3. Throughout construction, the Contractor shall exercise every reasonable precaution to prevent pollution and siltation of rivers, streams, or impoundments.
4. In case of failure on the part of the Contractor to control erosion and water pollution, the Engineer reserves the right to take whatever action is necessary to provide the proper corrective measures.

2) GROUNDWATER RESOURCES

The only opportunity for adverse impacts to groundwater quality due to highway construction would involve the percolation of contaminated surface waters into the groundwater. This differs from the situations described previously in that the contaminants contained in such construction site runoff would not typically include the heavy metal fractions or traffic-related contributions. Rather, the pollutant load would primarily involve native materials that were transported by the runoff. The characteristics of the area would indicate that the primary contaminants thus contained in the runoff would be suspended sediment and dissolved minerals. The sediment fraction would effectively be removed by physical filtration as the water percolates through the soil and no measurable impacts are expected for any of the alternates.

c. Air Quality

Construction activities are expected to have a temporary adverse air quality impact on the project areas with any of the build alternatives. Emissions generated by excavation and hauling activities would increase the level of fugitive particulates (dust) and may produce a dust nuisance to local residents and commercial establishments. The magnitude of such emissions would be directly related to the scope of the construction activity, and could be expected to be somewhat greater with the construction of wider roadway sections.[21]

[21] "Environmental Assessment Notebook Series: Volume 4 - Physical Impacts", DOT P5600.4, US DOT, 1985.

Gaseous emissions would be generated by large gasoline and diesel engines on construction vehicles and equipment. Amounts of such emissions would be dependent upon the size of the roadway being constructed as more equipment and support vehicles would be needed for efficient construction of wider

generated by the processing of roadway surfacing materials.[22] This source of emissions will not affect air quality in the immediate project area since processing plants for surfacing materials will be located some distance away from the work sites in Bozeman.

[22] Environmental Impact Analysis Handbook, Rau and Wooten, McGraw-Hill Book Company, 1980.

Precautions may be taken to minimize the air quality impacts likely to be experienced during construction of the roadway. These measures include the use of water or chemical additives to minimize dust generated within the construction site; vehicle speed restrictions; and the use of mulch and prompt reseeding of disturbed areas to minimize the potential for wind erosion. Compliance with all federal, state and local air quality regulations as well as all standard specifications and practices of the Montana Department of Highways relating to air quality would be required and enforced.

d. Noise

Assessment of construction noise impacts is dependent upon the noise source, its intensity, and the location and sensitivity of the noise receptor relative to the source. Construction noise will be generated by both mobile and stationary equipment. Mobile equipment consists of machinery such as dozers, scrapers or graders which operate in a cyclic fashion of full power followed by a period of reduced power. Stationary equipment consists of fixed power equipment such as pumps, generators and compressors or impact equipment like jackhammers or other pneumatic tools. Typical ranges in noise levels generated by construction equipment at a distance of fifty feet were compiled by the U.S. Environmental Protection Agency, and are contained in Table No. 11.[23] The type of equipment and its accompanying noise levels will vary throughout the project since construction activities will be completed in phases.

[23] "Environmental Assessment Notebook Series: Volume 4 Physical Impacts", US DOT, 1975.

Table No. 11

Typical Noise Levels for Selected Construction Equipment

Type	Noise Levels (dBA) at 50 ft.
Mobile Equipment	
Trucks	91
Dozers	80
Cranes	83
Scrapers	88
Graders	85
Rollers	74
Backhoes	85
Concrete Mixers	85
Paving Machines	89
Stationary/Impact Equipment	
Air Compressors	81
Jackhammers	88
Power Saws	78
Pneumatic Tools	85
Concrete Vibrators	76

Noise impacts due to construction activities are anticipated with any of the build alternatives, especially in residences and commercial establishments directly adjacent to construction zones. Several measures will be implemented to minimize impacts to noise sensitive uses along the project corridors. One of the measures which will be utilized for these projects includes the limitation of workhours on the construction site to daylight hours only. In addition, diesel and gasoline powered construction equipment will be required to be equipped with mufflers and be in continued good maintenance. It should be noted that construction noise impacts are of a temporary nature and use of these easy-to-implement measures should minimize most impacts likely to be experienced during the construction phase of this project.

2. Biological Environment

a. Vegetation

Construction of a new roadway of any design would entail stripping the vegetation cover and topsoil from the work area prior to any earthwork activities. The area to be affected by construction is planted with introduced species of grass, trees and shrubs. Topsoil removed from these areas will be replaced after construction and vegetative cover will be re-established according to Montana Department of Highways specifications. The size of the area disturbed by construction activities depends upon the width of the selected roadway alternatives. Wider roadway sections would result in more extensive vegetation removed than narrower sections.

b. Fish and Wildlife

Construction-related consequences to the fish and wildlife of the project corridors are minor, regardless of the alternative selected for implementation. Wildlife in the immediate area of construction would be disturbed; however, the area in which construction would take place provides little wildlife habitat and has limited wildlife potential. Properly timed construction activities (late summer to fall) would probably displace birds to adjacent habitat with minimal affects on bird production. Fish species (if present) in project area drainages could be impacted by sedimentation or siltation resulting from construction activities; however, numerous provisions exist to safeguard the quality of surface waters. Therefore, the adverse impacts to fish and wildlife resulting from construction of the project would not be significant.

3. Human Environment

a. Socio-Economic

1) SHORT-TERM ECONOMIC IMPACTS

Construction of the arterial projects would result in direct short-term economic benefits in Bozeman and the surrounding

area. Project development would create jobs and income for construction workers and contractors who would in turn purchase goods and services from the local area. If the primary contractor was retained from outside the region, the economic effect on the local economy would be commensurately less.

The greatest variables influencing both labor force and employment scheduling are the size of the primary contracting firm and the time of year that the contract is let. Assuming the projects will be funded in accordance with the priorities established by the Bozeman PCC, North 19th Avenue - Oak Street will be the initial project constructed and Kagy Boulevard would be constructed as funding allows after the completion of Project M1299(1). Work on North 19th Avenue and Oak Avenue is scheduled to begin around 1990; however, this date is dependent upon the availability of project funding. Based on labor estimates provided by MDOH and the likelihood that the North 19th Avenue - Oak Street project will be let in one contract, seasonal labor requirements were estimated. Table No. 12 summarizes these requirements.

The roadway widths of each alternative would not significantly affect labor mix and number of employees, but it could affect the duration of employment. It is likely that at least 50% of the labor force would probably be hired locally. The contractor, whether local or non-local, would probably fill the laborer, teamster, equipment operator, electrical subcontractor, and concrete job positions locally. Supervisorial staff and key equipment operators usually travel with the firm.

The scheduling for the Kagy Boulevard project is likely to be similar to that identified in Table No. 12; however, worker requirements would be proportionately less for the project since the scope of the project is less than that of the North 19th Avenue - Oak Street project.

Table No. 12

Typical Project Schedule and Worker Requirements

Typical Project Schedule and Number of Workers Required:

May	June-July-Aug.-Sept.	Oct.
12-25 (depending on the size of the contracting firm)	45	10-25

Type of Workers Required:

equipment operators	teamsters	concrete workers
electrical workers	flagmen, laborers	electrical workers
supervisors	electrical workers	painters, laborers
	equipment operators	
	supervisors	

2) DIRECT INCOME EFFECTS

The Montana Contractors' Association estimates that 25% of construction costs for urban roadway improvements projects are typically expended for construction worker wages.[24] Based on this estimate, the total worker wage payments for the construction of Projects M1299(1) and M1212(4) are estimated to range from $600,000 to $800,00 depending on which alternatives are ultimately constructed. Currently, the average construction worker wage is estimated to be $13.00 per hour.[25]

[24] Bill Olson, AGCA, Montana Contractors Association, in a personal communication March 5, 1985.

[25] Bob Robertson, Sletten Construction, Great Falls, in a personal communication June, 1985.

Table No. 13
Estimated Construction Worker Earnings

PROJECT	ALTERNATIVE 2 (Two-Lane)	3 (Two-Lane)	3 (Four-Lane)	4 (Four-Lane)	4/5 (Four-Lane)	5 (Two-Lane)
North 19th - Oak	$502,000	$603,000	$596,000	$534,000	$570,000	$490,000
Kagy Boulevard	$128,000	$168,000	$178,000	$169,000	$189,000	$106,000

The preceding table does not include estimates of wage and salary earnings by contractor management personnel or contractor profits. These earnings vary widely between projects and individual contractors.

A portion of the project's engineering and contingencies budget would be used to pay wages and salaries of MDOH personnel. These payments would also represent a positive direct income effect of the project.

3) INDIRECT EFFECTS AND TOTAL LOCAL INCOME EFFECTS

The distribution of local and non-local employment is also important because of differences in personal expenditure patterns. Nearly all of construction earnings by local workers could be expected to remain within the local economy. Non-local workers are likely to spend less than half of their earnings within the Bozeman-Gallatin County area.

Estimates of local indirect income effects of the North 19th Avenue - Oak Street and Kagy Boulevard projects are based on an economic model developed by Chalmers et. al. in 1977.[26] The model categorizes counties by the size of its market area and the goods and services provided within the county. The Chalmers model identifies the major western Montana counties, including Gallatin County, as third-order counties, and assigns an income multiplier of $1.02 to every dollar expended within these areas.

[26] "An Empirical Model of Spatial Interaction in Sparsely Populated Regions", James A. Chalmers, et. al., November 11, 1977.

In estimating income effects, it was assumed that project employment would be distributed equally between local and non-local residents. It was also assumed that local workers would expend 95% and non-local workers 40% of their earnings within the Bozeman-Gallatin County area economy. The following figures should be reduced by the percentage that local governments contribute to the project to calibrate the model

properly. The likelihood of a local government contribution is not known at this time. Total income effects in Table No. 14 are developed by adding estimates of direct earnings by local construction workers discussed previously to local indirect income effects.

Table No. 14
Indirect and Total Local Income Effects

PROJECT	ALTERNATIVE 2 (Two-Lane)	3 (Two-Lane)	3 (Four-Lane)	4 (Four-Lane)	4/5 (Four-Lane)	5 (Two-Lane)
North 19th - Oak:						
Local Worker Wages	$251,000	$301,000	$298,150	$267,000	$285,000	$247,000
Local Derivative Effects[1]	$346,000	$415,000	$411,000	$368,000	$393,000	$340,000
Total Local Income Effects	$597,000	$716,000	$709,150	$635,000	$678,000	$587,000
Kagy Boulevard:						
Local Worker Wages	$ 64,000	$ 84,000	$ 89,000	$ 85,000	$ 95,000	$ 53,000
Local Derivative Effects[1]	$ 88,000	$116,000	$122,000	$116,000	$130,000	$ 73,000
Total Local Income Effects	$152,000	$200,000	$211,000	$201,000	$225,000	$126,000

1. Includes effects of expenditures of non-local workers.

The preceding table assumes that half of the available construction jobs would be filled by residents of Gallatin County. If the number of jobs held by local residents were to be higher, or if a local contractor were to be the successful bidder, then local income benefits accruing to the region's economy would increase correspondingly. If concrete, fuel, and gravel are purchased from the local region, additional derivative income benefits to the region would result.

4) INDIRECT EMPLOYMENT EFFECTS

The North 19th Avenue - Oak Street and Kagy Boulevard projects will not have a major long-term impact on local employment opportunities. The size of the work force and duration of construction phases are relatively small. Although some local businesses may experience temporary sales increases, few, if any, are expected to add employees as a result of this project.

5) PUBLIC AND PRIVATE SERVICES

The short-term population effects from the project and impacts to public and private services are expected to be minimal because half of the employees are expected to be local, and construction is not expected to employ more than 45 persons. Since a certain percentage of students tend to leave the

Bozeman area during the summer (post-graduation and vacation) and since peak construction months are June through September, housing and other public services would be available and minimally impacted by the projects.

b. Transportation

The transportation resources and facilities of North 19th Avenue, Oak Street, and Kagy Boulevard areas would remain largely unaffected by the construction phase of any of the proposed roadway alternatives. However, reconstruction activities at major intersections may subject traffic to delays and detours. It is expected that other roads and streets in nearby areas would experience short-term increases in traffic volumes as motorists utilize alternate routes to avoid construction detours and delays. Air service and rail service would be unaffected by project construction.

c. Utilities

Early in the design phase of the proposed improvement projects, all public and private utilities will be contacted in an effort to identify impacts of the construction activities on the supply and distribution lines of each utility. This early coordination will allow each utility company to determine the extent of system modification required and will allow for revisions in the design of each system. It is anticipated that relocation activities will be performed prior to and during roadway construction. All existing and required utility poles will be placed behind the sidwalk to enhance both the safety and appearance of the roadway. Measures to mitigate utility impacts are also discussed in Part VI, "Mitigating Measures", of this document.

d. Traffic Safety

Since the project will primarily involve construction in undeveloped areas, traffic in the project area is likely to be affected at the major intersections adjoining the projects. The anticipated delays and detours would require provisions for traffic safety in the construction area. The Montana Department of Highways, in conjunction with the construction contractor, would develop and employ a traffic control plan in and around work sites. A combination of temporary signing, flagmen, detours, and mandatory speed reductions may be used to facilitate traffic within the construction zones.

Use of the Kagy Boulevard construction zone by pedestrians and bicyclists also merits special attention in the construction traffic safety program. In general, pedestrian access throughout the construction zone should pose no problems. OSHA-mandated warning devices on construction equipment provide an effective safeguard against potential pedestrian-equipment conflicts. Although bicyclists may be routed like motorized vehicles, their presence in construction zones warrants additional consideration.

4. Cultural, Recreational, and Visual Environment

a. Archaeological and Historical

Since construction of North 19th Avenue will require the acquisition and clearing of a 30 to 38-foot-wide strip of property from the Smith farm site, the ultimate disposition of the farmhouse structure will dependent upon the selected build alternative. If the wide alternative is selected, removal or relocation of the structure will be completed prior to construction. If the remaining build alternatives are selected and the farmhouse is retained in its original position, strict construction limits must be established to avoid impacts due to the proximity of the roadway to the farmhouse.

In the event that significant properties are discovered during construction, the Montana Department of Highways Standard Specifications for Road and Bridge Construction provides that "when any contractor's operation encounters remains of prehistoric peoples dwelling sites or artifacts of historical or archaeological significant, the operation will be temporarily discontinued until notified by the Engineer to resume work. The Engineer will contact archaeological authorities to determine the disposition thereof." This policy should provide adequate protection to all unanticipated cultural resources discovered during construction activities.

b. Recreational

The recreational sites in the project areas will experience minimal impacts during the construction phases of the projects. The proposed construction in the North 19th Avenue - Oak Street area will not impact the undeveloped North Ninth Avenue Park. Since initial construction activities on Kagy Boulevard are likely to be limited to the area between South 19th and South 11th Avenues and the existing portion of Kagy Boulevard will be utilized, no construction impacts are anticipated for recreational properties on the MSU campus.

c. Visual

An adverse impact to the visual quality of the project areas is unavoidable for all alternatives involving construction activity. A certain amount of short-term unsightliness due to earthwork would occur during construction. Due to the temporary nature of the construction and the required revegetation of the disturbed areas, the overall significance of these impacts are considered minor.

H. Summary of Costs

1. Right-of-Way Cost Estimates

Estimates detailing the costs of acquiring project rights-of-way and relocating any residences or businesses that lie within the proposed rights-of-way were developed by the Montana Department of Highways, Right-of-Way Bureau. The estimates

identify the owners of all parcels likely to be affected by the proposed projects and indicate the amount of right-of-way required from each parcel to provide for the development of adequate right-of-way corridors. The cost estimates also recognize that significant utility conflicts and relocations will be required through previously undeveloped portions of the project areas. The following table summarizes the right-of-way costs associated with each of the roadway alternatives considered in the EIS evaluations.

Table No. 15

Right-of-Way Costs for Projects M1299(1) and M1212(4)

COST ITEM	ALTERNATE 2 (Two-Lane)	3 (Two-Lane)	3 (Four-Lane)	4 (Two-Lane)	4/5 (Four-Lane)	5 (Two-Lane)
North 19th - Oak:						
Acquisition/Relocation	$ 189,010	$ 212,610	$ 212,610	$ 189,010	$ 189,010	$ 189,010
Utility Relocations	178,900	178,900	178,900	178,900	178,900	178,900
Total (R/W):	$ 367,910	$ 391,510	$ 391,510	$ 367,910	$ 367,910	$ 367,910
Kagy Boulevard:						
Acquisition/Relocation	$ 145,000	$ 145,000	$ 145,000	$ 145,000	$ 145,000	$ 145,000
Utility Relocations	22,000	22,000	22,000	22,000	22,000	22,000
Total (R/W):	$ 167,000	$ 167,000	$ 167,000	$ 167,000	$ 167,000	$ 167,000

It is the City of Bozeman's policy that right-of-way donations must occur prior to the annexation of new subdivisions. Since several subdivisions have been proposed for areas adjacent to North 19th Avenue and Oak Street, it is desirable to include such donations in the development of right-of-way cost estimate. Therefore, the cost of right-of-way acquisition/relocation presented for North 19th Avenue - Oak Street recognizes the fact that developer dedications of right-of-way have been made or are likely to be made along the corridor.

It should also be noted that right-of-way acquisition for both projects will be initiated as soon as funding allows. The City of Bozeman's current FAU program will allow the acquisition of rights-of-way for both projects to occur during FY 1987 and FY 1988. The cost of easements for cut and fill slopes have not been included in the above estimates; however, easement requirements and associated costs will be identified as part of the project design activities.

2. Construction Cost Estimates

Detailed preliminary design layouts were prepared for each alternative considered for the North 19th Avenue - Oak Street and Kagy Boulevard projects. These preliminary design layouts together with supplemental design data (i.e., typical roadway sections and existing terrain characteristics) allowed design features and work items to be quantified for each alternative. Average bid prices from recent MDOH bid tabulation summaries were applied to the quantities to develop construction cost estimates for each alternative.[27] The detailed design layouts,

27 "Tabulation of Low Bid Prices and Computation of Average Prices for the Period January, 1984 through December, 1984", MDOH Contract Plans Section, January 23, 1985.

summary of quantities, unit prices, and costs for each alternative are on file and available for review at the Montana Department of Highways' Office in Helena.

The following tables contain the estimated construction costs of each of the build alternatives considered for North 19th Avenue - Oak Street and Kagy Boulevard. It should be noted that all construction costs presented in these estimates are based on 1984 dollars and do not include right-of-way acquisition costs. A number of the construction cost items, particularly costs associated with drainage and irrigation and with the modification of existing major intersections, vary somewhat by alternative; however, the differences are considered to be minimal.

Table No. 16
North 19th Avenue - Oak Street - M1299(1)
Initial Facility Construction Costs

COST ITEM	ALTERNATE 2 (Two-Lane)	3 (Two-Lane)	3 (Four-Lane)	4 (Two-Lane)	4/5 (Four-Lane)	5 (Two-Lane)
1. Excavation	$ 79,200	$ 191,800	$ 191,800	$ 141,900	$ 166,000	$ 89,400
2. Surfacing and Striping[1]	840,000	1,129,600	1,104,300	904,800	1,026,100	795,700
3. Drainage and Irrigation[2]	795,900	795,900	795,900	795,900	795,900	795,900
4. Lighting (Minor Intersections)	21,300	21,300	21,300	21,300	21,300	21,300
5. Major Intersections[3]	271,900	271,900	271,900	271,900	271,900	271,900
Subtotal:	$2,008,300	$2,410,500	$2,385,200	$2,135,800	$2,281,200	$1,974,200
10% Contingency 15% Engineering	502,100	602,600	596,300	534,000	570,300	493,600
Total (Construction):	$2,510,400	$3,013,100	$2,981,500	$2,669,800	$2,851,500	$2,467,800

1. Includes cost of surfacing, striping, curb and gutters as well as sidewalk and boulevard preparation.
2. Includes cost of relocating the Farmer's Canal and piping it underground. The item does not include the cost of facilities associated with detention of stormwater.
3. Includes modification of existing approaches where applicable. The item includes cost of lighting the major intersections at North 19th/Durston, North 19th/Oak, and Oak/North Seventh and signalizing Oak/North Seventh only.

The capacity analyses conducted for North 19th Avenue and Oak Street determined that traffic signals will be required at the North 19th Avenue - Durston Road and North 19th Avenue - Oak Street intersections by 1995. Since signalization may be warranted relatively early in the design life of the facility and may not be included in the initial construction project, it was considered appropriate to develop and present a cost estimate for the installation of signals at both locations. The estimated cost of signalizing both intersections would be approximately $98,000 in 1984 dollars.

The initial construction costs presented in Table No. 17 assume that Kagy Boulevard would be completely reconstructed from South 19th Avenue to the Greek Way, where the previous improvement project M1212(1) was terminated. No salvage value for the existing roadway section (South 11th Avenue to Greek Way) has been assumed.

Based on the capacity analyses conducted for major intersections along Kagy Boulevard, it was determined that signalization will be necessary at four locations to maintain desirable traffic flows during the life of the facility. Assuming a "worst case" scenario, the Kagy Boulevard intersections with South 19th Avenue and South Third/Willson Avenue are projected to satisfy the volume warrants no earlier than 1995 and the intersections at South 11th and South Seventh Avenues no earlier than the year 2007.

Table No. 17
Kagy Boulevard M1212(4)
(South 19th Avenue to Greek Way)
Initial Facility Construction Costs

COST ITEM	ALTERNATE 2 (Two-Lane)	3 (Two-Lane)	3 (Four-Lane)	4 (Two-Lane)	4/5 (Four-Lane)	5 (Two-Lane)
1. Excavation	$ 57,600	$ 89,800	$ 102,000	$ 96,500	$ 115,500	$ 57,100
2. Surfacing and Striping[1]	580,400	621,000	670,500	622,300	729,500	458,500
3. Drainage and Irrigation	259,600	259,600	259,600	259,600	259,600	259,600
4. Lighting (Minor Intersections)	23,700	23,700	23,700	23,700	23,700	23,700
5. Major Intersections[2]	55,500	55,500	55,500	55,500	55,500	55,500
Subtotal:	$ 976,800	$1,049,600	$1,111,300	$1,057,600	$1,183,800	$ 854,400
10% Contingency 15% Engineering	244,200	262,400	277,800	264,400	295,900	213,600
Total (Construction):	$1,221,000	$1,312,000	$1,389,100	$1,322,000	$1,479,700	$1,068,000

1. Includes cost of surfacing, striping, curb and gutters as well as sidewalk and boulevard preparation.
2. Includes cost of modifying the north and south approaches and lighting the South 19th/Kagy intersection.

Significant geometric changes, in conjunction with signalization, will be needed at the Kagy Boulevard - South Third/Willson Avenue intersection to meet the minimum facility requirements for design year traffic volumes. For purposes of the EIS, it is assumed the intersections would be reconstructed as one four-way intersection by terminating South Third Avenue, north of Kagy Boulevard, and by shifting the south approach to the intersection eastward to match the existing alignment of Willson Avenue. The realignment of South Third Avenue in this manner would require the acquisition of minor amounts of right-of-way near the intersection and the construction of approximately 350 feet of new roadway and transition to the existing facility. Pavement widening on the west approach to the intersection would be necessary to accommodate right turn movements. The north and east approaches would require some striping and median modifications to provide turning lanes or bays. The resultant configuration would be safer and would facilitate traffic flows much more effectively than the existing intersection. The estimated cost of signalizing and reconstructing the Kagy Boulevard - South Third/Willson Avenue intersection is $154,000 (includes right-of-way costs). It is estimated that signalization of the Kagy Boulevard - South 19th Avenue intersection would cost $49,000. The cost of signalizing the intersections at South 11th and South Seventh Avenues is estimated to be $100,000 in 1984 dollars.

3. North 19th Avenue Extension

Although the construction of North 19th Avenue between Oak Street and Baxter Lane is not included in Project M1299(1), this section of roadway is essential to the development of the 19th Avenue arterial. The construction of a traffic facility in this location will provide the necessary linkage between the improvement projects on North 19th Avenue - Oak Street and East Valley Center Drive and will provide traffic relief on North Seventh Avenue. Future residential and commercial development in this portion of Bozeman is somewhat contingent upon the access improvements that will be provided by the roadway.

It was assumed for this evaluation that North 19th Avenue, between Oak Street and Baxter Lane, would be constructed as an undivided 28-foot-wide "rural" two-lane roadway with two 12-foot-wide travel lanes and two-foot-wide paved shoulders. An additional six feet of gravel would be placed adjacent to each side of the roadway to provide a total shoulder width of eight feet. The north approach to the North 19th Avenue - Oak Street intersection would be widened to accommodate a 12-foot-wide left-turn lane. It is further assumed that no sidewalks would be included and that roadway drainage facilities would be kept to a minimum. Based on these assumptions, estimates of right-of-way and construction costs were developed. These costs are summarized below:

Right-of-Way:	
Right-of-Way Acquisition Costs	$ 85,200
Utility Conflicts/Relocations	63,450
Total Right-of-Way Costs	$148,640
Construction:	
Excavation	$ 33,300
Drainage and Irrigation	43,600
Surfacing and Striping	154,700
Total Construction Costs	$231,600
25% Engineering/Contingency	$ 57,900
Total Construction Costs	$289,500

As indicated previously, the City of Bozeman requires the dedication of the rights-of-way necessary for traffic corridors as a condition of annexation. The developers in the areas adjacent to this portion of North 19th Avenue have proposed that their properties be annexed to the city. When annexation occurs, the costs for right-of-way acquisition would be totally defrayed through developer donations and the cost of the project would be significantly reduced. The total cost of the proposed extension of North 19th Avenue is the sum of the right-of-way and construction costs. Currently, no source of

funding has been identified for the development of North 19th Avenue from Oak Street to Baxter Lane.

4. Stage and Interim Facility Construction

The majority of the discussion and analysis contained in the EIS focuses on the impacts of initially constructing those design features of the alternatives that are both necessary and desirable for design year traffic operations. Several concerns, including the estimated costs of the facilities, the limited project funding, and the immediate need for the projects, have prompted the consideration of measures that will increase the affordability of the projects and move construction dates ahead. These concerns may be addressed by minimizing or eliminating the design features of the alternatives that are not initially required or essential to the proper operation of the traffic facilities. The use of stage construction or the construction of an interim facility would increase the affordability of both projects substantially.

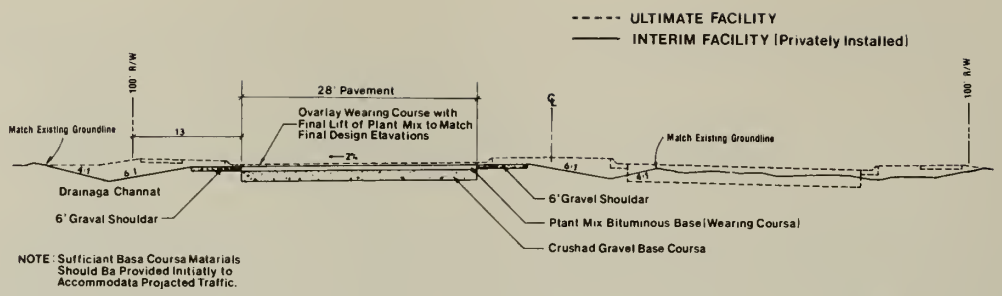
A staged approach to construction would consist of the installation of the minimal serviceable facility followed by a step-by-step improvement of the roadway as expenditures were justified by increased usage. Previously completed stages would be salvaged until the ultimate facility design was realized. Interim construction differs somewhat from stage construction in that the initial facility would be designed only to meet a short-term need and would have a limited facility life. The construction of the ultimate design would be postponed until absolutely necessary or until sufficient funding is available. Portions of the interim facility may or may not be salvageable for the ultimate roadway design. Both approaches to construction offer considerable opportunities relative to cost savings and the flexibility for expansion as warranted by increased facility usage.

Stage construction of any of the alternatives would require that decisions be made regarding alignment and the placement of facilities within the right-of-way corridor. The initial facility could be offset to one side of the right-of-way (similar to the two-lane version of Alternative 5) or constructed on the centerline of the ultimate facility. If the facility is offset within the right-of-way, any future construction could occur adjacent to the existing facility. Traffic disruptions during further construction activities could be minimized. Since the initial roadway may comprise half of the ultimate facility, it would be desirable to drain all runoff to one side of the road (cross drainage) (rather than both sides as typically done on crowned roadway sections. Drainage to one side of the right-of-way may make the provision of roadside ditches difficult due to the limited area between the edge of the roadway and the right-of-way line. Additional drainage easements or right-of-way may be necessary to accommodate roadside ditches unless a piped storm drainage system is installed.

Construction of the initial facility on the ultimate centerline would require that future improvements be installed adjacent to both roadway edges. Provisions to maintain traffic flows on the facility would have to be utilized because construction activities may be disruptive during facility expansion. This approach to construction would allow a crowned road section compatible with the ultimate design to be installed. Drainage impacts would be less than those associated with an offset facility since more right-of-way is available for the installation of drainage provisions along the roadway.

Interim roadways on North 19th Avenue and Oak Street may be privately constructed within the next several years. The City of Bozeman has required the developers of large tracts located west of North 19th Avenue and north of Oak Street to install paved access roads prior to obtaining approvals for subsequent phases of subdivision development. The developers plan to construct Oak Street from North Seventh to North 19th Avenue and North 19th Avenue from Durston Road to Oak Street. The developers have already donated rights-of-way for North 19th Avenue and Oak Street and propose to install 28-foot-wide paved roadways within this donated right-of-way. The interim roadways would be placed to the west side of the North 19th Avenue right-of-way corridor and to the north side of the Oak Street corridor. At this time, it appears likely that the interim roadway on Oak Street will be constructed prior to the facility on North 19th Avenue. The developers and the City of Bozeman intend to construct the roadways in a manner that will allow as much of the interim facilities as feasible to be incorporated into the development of the preferred alternatives for North 19th Avenue and Oak Street.

Since it is desirable and cost-effective to utilize as much of the interim roadway as possible in the final design of the preferred alternative, it is essential that the interim facility be placed in the right-of-way and constructed to elevations that will be compatible with the ultimate facility design. The following exhibit depicts how such an interim roadway on North 19th Avenue and Oak Street may be designed and placed to maximize its usefulness in the development of the preferred alternative. It is notable that the recommended typical section of the interim roadway is cross-drained rather than crowned. Curbs and gutters, centralized drainage facilities, sidewalks, boulevards, and median areas can be installed as funding allows. The pavement surface of the interim facility must be overlaid with plant mix bituminous surfacing to match final design elevations. The overall project cost savings that may be realized from the construction of these interim roadways cannot be estimated because design plans for the privately-funded roads have not yet been prepared.


ULTIMATE FACILITY
INTERIM FACILITY (Privately Installed)
100' R/W
28' Pavement
Overlay Wearing Course with Final Lift of Plant Mix to Match Final Design Elevations
Match Existing Groundline
13
Drainage Channel
6' Gravel Shoulder
6' Gravel Shoulder
Plant Mix Bituminous Base (Wearing Course)
Crushed Gravel Base Course
NOTE: Sufficient Base Course Materials Should Be Provided Initially to Accommodate Projected Traffic.

Recommended Incorporation of Interim Facilities in the Ultimate Development of North 19th - Oak Street

The Bozeman Policy Coordinating Committee, at the recommendation of the Technical Advisory Committee, indicated its desire to utilize a stage construction approach for the development of Kagy Boulevard. PCC requested that initial construction be undertaken from South 19th to South 11th Avenue and consist of the installation of a 58-foot-wide "rural" pavement section with drainage channels along each side of the roadway. Subsequent stages of the project would include: construction of the complete preferred alternative between South 11th Avenue and Greek Way; add-on installation of curb and gutter, centralized drainage facilities and sidewalks between South 19th and South 11th Avenues; and signalization of major intersections along Kagy Boulevard.

5. Maintenance Cost Estimates

The City of Bozeman will be responsible for roadway maintenance activities on North 19th Avenue - Oak Street and Kagy Boulevard after the facilities are placed in operation. Since additional expenditures will be required of the City to maintain the roadways, it is appropriate to provide estimates of the annual costs of both general maintenance and snow removal/sanding for each alternative evaluated in the EIS.

Estimates of annual maintenance costs for each of the alternatives considered for the North 19th Avenue - Oak Street and Kagy Boulevard projects were developed from Montana Department of Highways' records of costs for state-maintained urban roadways. The Department's maintenance records typically identify annual costs for general maintenance items (i.e., minor road repairs, signing, street cleaning, etc.) and for snow removal and sanding/de-icing. Portions of 12 roadways within western Montana, including six two-lane and six four-lane roads, were selected for an analysis of annual maintenance costs based on their locations in urban areas and the design features of each typical section. Three years of maintenance records were examined for each roadway to establish average annual maintenance costs for both two-lane and four-lane urban highways. Average annual maintenance costs were adjusted to account for inflationary factors and provide 1985 estimates for such costs.[28]

28 "Highways, Fourth Quarterly Cost Roundup", Engineering News Record, December 19, 1985, p. 86.

Based upon the analysis of maintenance records for the selected urban roadways in western Montana, the average annual cost of general maintenance per mile of roadway was determined to be approximately $127 per foot of pavement width. The annual cost of snow removal and sanding/de-icing was averaged for all of the two-lane and all of the four-lane urban sections evaluated in the maintenance cost analysis. The cost of snow removal and sanding/de-icing is assumed to be similar for all four-lane alternatives considered for North 19th Avenue - Oak Street and Kagy Boulevard, since there is little discernible difference in the cost to plow and sand a 12-foot lane versus a 14-foot lane. The estimated annual maintenance costs for each of the roadway alternatives evaluated in the EIS are presented in Table No. 18.

Table No. 18

Annual Maintenance Costs by Alternative (Per Mile of Roadway)

Alternative	General Maintenance	Snow Removal and Sanding	Total
North 19th - Oak Street			
"No-Build"	N.A.	N.A.	N.A.
Alt. 2 (43' Two-Lane)	$ 5,459	$ 975	$ 6,434
Alt. 3 (91' Two-Lane)	11,552	975	12,527
Alt. 3 (91' Four-Lane)	11,552	2,777	14,329
Alt. 4 (66' Two-Lane)	8,378	975	9,353
Alt. 4/5 (78' Four-Lane)	9,902	2,777	12,679
Alt. 5 (32' Two-Lane)	4,062	975	5,037
Kagy Boulevard			
"No-Build"	N.A.	N.A.	N.A.
Alt. 2 (43' Two-Lane)	$ 5,459	$ 975	$ 6,434
Alt. 3 (69' Two-Lane)	8,759	975	9,734
Alt. 3 (69' Four-Lane)	8,759	2,777	11,536
Alt. 4 (62' Two-Lane)	7,871	975	8,846
Alt. 4/5 (78' Four-Lane)	9,902	2,777	12,679
Alt. 5 (32' Two-Lane)	4,062	975	5,037

The information and methodology utilized to develop the annual maintenance costs for each alternative is on file and available for review at the Montana Department of Highways' Office in Helena.

Part V: Section 4(f) Evaluation

A. Purpose and Requirements

Section 4(f) of the 1966 U.S. Department of Transportation Act (49 U.S.C. 303) states that an effort must be made to preserve the natural character of public parks and recreation areas, wildlife and wildfowl refuges, and historic sites that would be affected by roadway construction projects. Section 4(f) requirements are applicable if a proposed roadway project:

- Takes land from a public park, wildlife refuge or recreation area of national, state, or local significance.
- Takes land from a historic site of national, state, or local significance.
- Uses land from a publicly-owned tract that is not officially designated as a park, recreation area or wildlife refuge, but that is being used for this purpose on a permanent basis if the official having jurisdiction believes its use as a 4(f) type area is significant.

In addition, the requirements of Section 4(f) are stated in 23 CFR Subsection 771.135 as follows:

> No administrative action will use land from a significant publicly owned park, recreation area or wildlife and waterfowl refuge or any significant historic site unless a determination is made that:
>
> (1) There is no feasible and prudent alternative to the use of land from the property; and
>
> (2) The proposed action includes all possible planning to minimize harm to the property resulting from such use."

The purpose of the following parts of this Section 4(f) evaluation is to identify potentially affected properties, assess the impacts on each property, and demonstrate that the project complies with Section 4(f) requirements.

B. Section 4(f) Resources

Investigations to identify cultural resources potentially affected by the improvement of North 19th Avenue, Oak Street, and Kagy Boulevard included literature searches, pedestrian surveys, and records searches. Historical Research Associates (HRA), a cultural resources consulting firm from Missoula, was retained to identify historic sites in or near project corridors and to evaluate the impacts of the proposed projects on

each site. The cultural resource survey did not identify any archaeological resources; however, the survey did identify two historic sites within the project areas.

The Boylan farm is located near the intersection of Willow Way and Kagy Boulevard and consists of a house and several farm-related outbuildings. The property is the site of the original Gallatin County Poor Farm, which was operated from the mid-1880's to 1905 on a contract basis in support of the county's poor. Although many of the structures that existed on the Poor Farm have been razed, several structures on the site may date to the Poor Farm period but appear to have been moved from their original locations. The current owners of the property have also recovered an artifact (a grooved maul) from the site; however, no subsurface tests for lithic materials were conducted because lands were under cultivation with crops or with lawn at the time of the field investigations. A pedestrian survey of the site yielded no indication of cultural resources. Based upon all investigations conducted for the site, HRA determined that the Boylan farm does not meet the eligibility requirements for listing on the National Register of Historic Places.[1] This determination was made because many of the key structures have been destroyed, and the integrity of the original Gallatin County Poor Farm has been severely compromised.

[1] "Cultural Resource Inventories of the Kagy Boulevard and North 19th Avenue/Oak Street Extensions", Historial Research Associates, Missoula, Montana, August 9, 1985, p. 19.

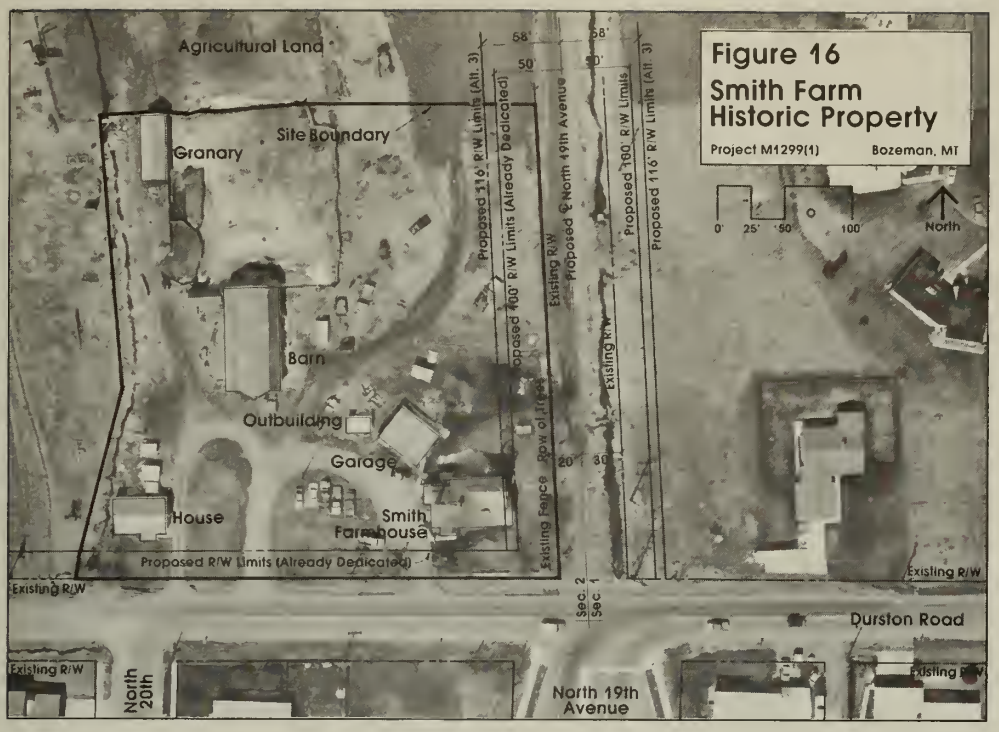
The Smith farm consists of a house and several farm or ranch-related buildings and is located at the northwest corner of the North 19th Avenue - Durston Road intersection within the city limits of Bozeman. An evaluation of the site by HRA determined that several of the existing structures are architecturally significant and meet the eligibility requirements for listing in the National Register.[2] The State Historic Preservation Office was consulted regarding the significance of the Smith farm property and concurred with HRA's determination that the site meets the eligibility requirements for listing in the National Register.[3] Figure 16 shows the location of the Smith farm and identifies the structures contained within the boundaries of the historic property.

[2] Historical Research Associates, p. 28.

[3] Patricia Bick for Marcella Sherfy, State Historic Preservation Officer in a personal communication September 20, 1985.

The main structure on the site, a two and one-half story wood frame farmhouse, was constructed in the 1890's and has maintained its original integrity despite the addition of a covered stairway to the side of the house. The architectural historian retained for the study determined that the architectural style of the house is unique for its time period and in the structural history of Bozeman.[4] The farmhouse is built in a Victorian architectural style common to the area and has incorporated several elements characteristic of a Queen Anne style into its design. The structure is in fair to good condition and has retained its integrity of design in terms of massing, scale, window, door, and porch details.

[4] Historical Research Associates, p. 21, 28.



Three other structures on the Smith property, including a barn, a granary, and a small outbuilding, add to the architectural significance of the site. The barn, a two-story wood frame structure built in the 1920's features a New England gambrel roof with a projecting eave on its south elevation. The granary was built in the early 1900's utilizing a "studs-out" construction technique. The structure rests on stone piers and has clapboard siding. A small rectangular, wood frame structure with a gabled roof also dates to the early years of the farm's operation. A concrete block garage and a small remodeled house represent intrusive elements and do not contribute to the site's local architectural significance.[5]

[5] Historical Research Associates, p. 28.

Photo 10
The architectural historian retained for the cultural resources survey determined that the Smith farm house is architecturally significant for its period in the structural history of Bozeman and is eligible for inclusion in the National Register.

It should be noted that the historic site is part of a large 243-acre tract, known as the Annie Subdivision, which was recently annexed by the City of Bozeman. The owner/developer proposed to develop the parcel in phases with residential, offices, and light commercial uses. The area currently occupied by the farmhouse and its attendant structures will ultimately be the site of a small commercial center proposed for the last development phase of the Annie Subdivision. The developer of the property indicated the farmhouse structure will be moved to another location on the site; however, the owner did not specify when such a relocation was likely to occur. Initial construction of Phase I was scheduled to begin during the fall of 1985.

C. Impacts to Section 4(f) Resources

The improvement of North 19th Avenue from Durston Road to Oak Street will require the acquisition of additional right-of-way from both sides of the proposed alignment. A right-of-way corridor of sufficient width to accommodate a four-lane roadway will be acquired for all build alternatives since North 19th Avenue will function as an arterial street. The two right-of-way options considered for this project include a 116-foot-wide right-of-way, similar to the corridor that exists on North 19th Avenue south of Durston Road, and a 100-foot-wide right-of-way, the proposed City of Bozeman standard for arterial streets.

Construction of Alternative 3 (91-foot-wide roadway) will require the acquisition of a 58-foot-wide strip from the eastern portion of the site and the right-of-way would extend into the area presently occupied by the Smith farmhouse. The remaining build alternatives will require a 50-foot-wide strip from the eastern edge of the site and will not directly impact the structure. All build alternatives will require the removal of a row of cottonwood trees and a wrought-iron fence located at the eastern edge of the site. Figure 16 depicts the location of the proposed project rights-of-way relative to the structures at the site.

The owner/developer of the Annie Subdivision was required to dedicate land for the widening of portions of Durston Road and for the extension of North 19th Avenue as conditions of annexation to the city. The developer dedicated a 50-foot-wide strip along the east edge of the property and a 15-foot-wide strip at the south boundary of the property as right-of-way to accommodate the proposed roadway improvements. The newly dedicated right-of-way along North 19th Avenue will be from three to eight feet east of the farmhouse and is coincident with the western limits of the proposed 100-foot-wide right-of-way. The "new" right-of-way line along the north side of Durston Road will be located some 20 feet south of the existing farmhouse structure. The City of Bozeman requires that the developer construct a paved access road within the right-of-way corridor for North 19th Avenue prior to the development of subsequent stages of the subdivision. The developer tentatively plans to construct a 28-foot-wide paved road along the west

side of the right-of-way corridor as early as next year (1987).[6]

[6] Paul Kincella, engineer for the developer of the Annie Subdivision, in a personal communication May 9, 1986.

Studies conducted for the North 19th Avenue corridor indicate that noise impacts are likely to occur at some locations under design year traffic conditions. Computer modeling determined that exterior noise levels along North 19th Avenue, between Durston Road and Oak Street, will exceed FHWA noise abatement criteria for residential uses at all locations within 145 feet of the proposed roadway centerline. The distance between the Smith farmhouse and the nearest travel lane varies from 21 feet (for the preferred alternative, Alternative 4/5 four-lane version) to 41 feet (Alternative 2) for those alternatives that utilize a 100-foot-wide right-of-way. The projected exterior noise levels for the Smith farmhouse (see Test Location 6 in Figure 9 and Table No. 8) will exceed FHWA noise abatement criteria of 70 dBA in the design year for all build alternatives. As shown in Table No. 8, predicted noise levels range from 72 to 73 dBA for the two-lane alternatives and from 71 to 72 dBA for the four-lane alternatives.

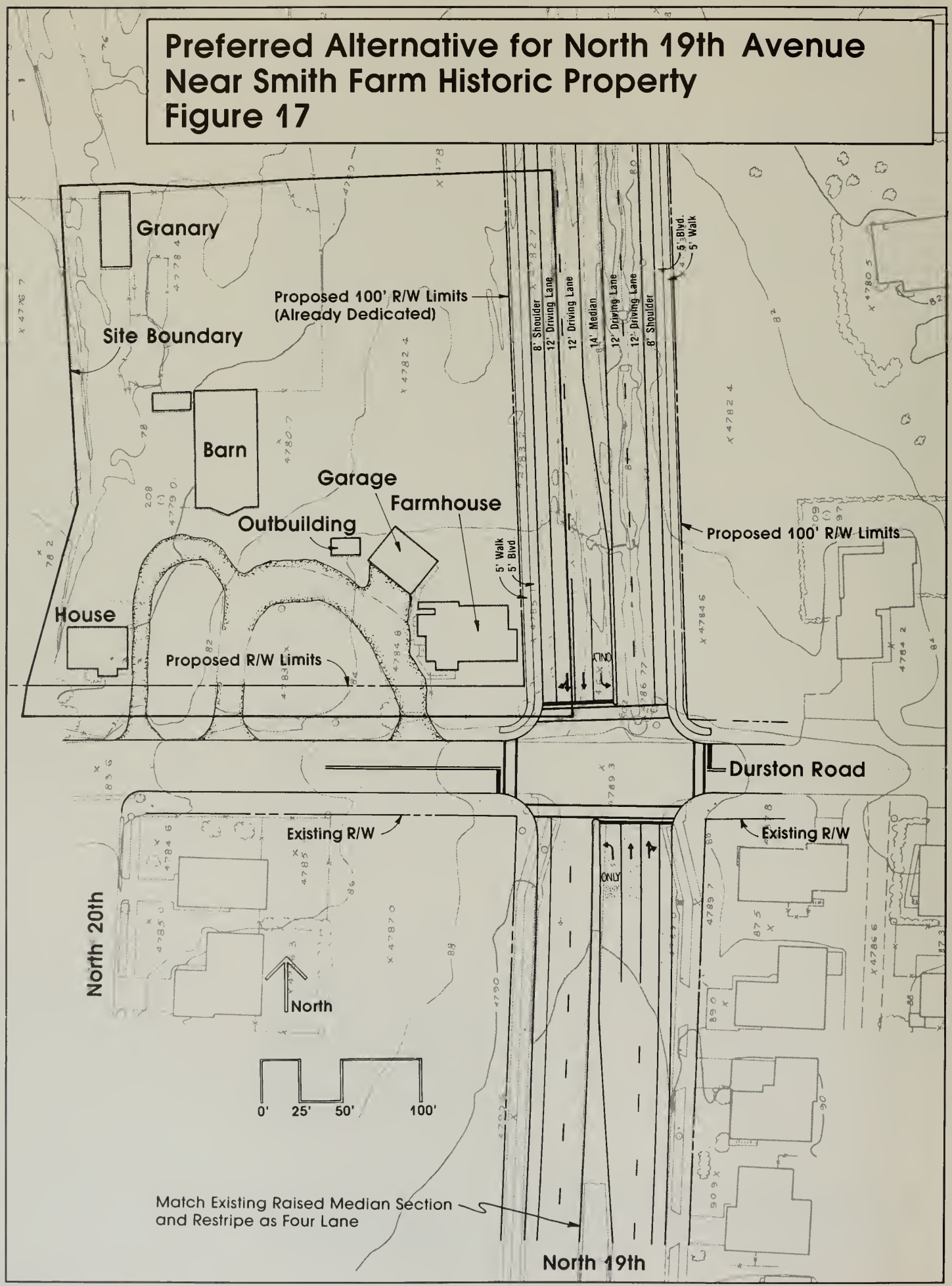
Preliminary design studies for North 19th Avenue in the vicinity of the Smith farmhouse indicate that fill material will be required on the north approach to the Durston Road intersection to match the existing roadway elevation. The construction of the four-lane alternatives would require that the fill material extend beyond the right-of-way limits and into the area occupied by the farmhouse structure unless special construction or design modifications are employed.

The layout of the preferred alternative for North 19th Avenue in the vicinity of the Smith farm historic property is shown in Figure 17. The figure depicts the location of major design features of the preferred alternative relative to the Smith farmhouse and shows the required alignment modification on the south approach to the North 19th Avenue - Durston Road intersection. It should be noted that installation of an interim 28-foot-wide two-lane roadway along the west side of the right-of-way for North 19th Avenue, as proposed by the developer of the Annie Subdivision, will require that a transition be constructed on the north approach to the North 19th Avenue - Durston Road intersection to provide an acceptable alignment with the existing divided two-lane south approach. Such a transition would lessen some initial impacts to the Smith farmhouse since the travel lanes of the interim roadway would be placed further east than their ultimate location in design of the preferred alternative. Additionally, no sidewalks, boulevards, or curbs and gutters will be initially installed by the developer; therefore, the area adjacent to the farmhouse structure disturbed by interim road construction would be less than that affected by construction of the preferred alternative.

D. Avoidance Alternatives

The location of this project has been determined through previous transportation planning efforts by the City of Bozeman

Preferred Alternative for North 19th Avenue Near Smith Farm Historic Property Figure 17



and Gallatin County and the previously completed improvements on Federal Aid Urban Route 1201. Therefore, the only alternatives to the taking of property from the Smith farm historic site would involve realignment, reduction size of the proposed facility, or selection of the "no-build" alternative.

The alignment as proposed will require the acquisition of portions of nine parcels adjacent to the east side and part of one large parcel adjacent to the west side of North 19th Avenue. The estimated right-of-way acquisition cost is $99,300 for the 116-foot right-of-way and $73,200 for the 100-foot right-of-way. It should be noted that the developer of the Annie Subdivision, the large parcel adjacent to the west side of North 19th Avenue, has donated half of the right-of-way required for a 100-foot-wide corridor as a condition of annexation to the City of Bozeman. Therefore, the costs presented above do not represent the "true" cost of right-of-way acquisitionalong North 19th Avenue. Adjusted acquisition costs for the 116- and 100-foot-wide rights-of-way are $57,700 and $31,600, respectively.

The taking of property from the Smith farm historic site could be avoided if the roadway alignment of North 19th Avenue were shifted eastward. The possible alignments that could be utilized to avoid the Smith farm include: 1) an eastward shift in the alignment of North 19th Avenue from Durston Road to Oak Street; or 2) an eastward shift in alignment only in the area adjacent to the historic properties with a transition back to the originally proposed road location. An alignment shift of North 19th Avenue between Durston Road and Oak Street would require that the proposed roadway centerline be moved 30 feet to the east for the alternatives that utilize a 100-foot-wide right-of-way corridor and 38 feet east for the alternative that utilizes a 116-foot-wide right-of-way. This alignment change would require additional right-of-way from the more densely developed residential areas along the east side of North 19th Avenue.

The eastward shift in the alignment of North 19th Avenue from Durston Road to Oak Street would require that all right-of-way be taken from the nine residential properties and the trailer court that exists adjacent to the east side of the proposed roadway. This alignment would require that 50 or 58 feet of right-of-way be taken from the lots adjacent to the east side of North 19th Avenue. Since the remaining parcels would not meet minimum setback requirements, it is assumed that a total purchase of the affected parcels would be justified. Based on this assumption, the estimated costs associated with this right-of-way taking are $245,750 for the 116-foot-wide corridor and $209,000 for the 100-foot-wide corridor.

An alignment shift to the east in the vicinity of the Smith farmhouse and the construction of a transition to the right-of-way as proposed north of the site would totally avoid the historic properties. The shift in alignment would be constructed for a distance of 150 feet north of Durston Road and the transition (at 50:1) to the proposed right-of-way would be completed within 1,900 feet for all build alternatives. This

change in alignment would require additional right-of-way from the east side of North 19th Avenue for the length of the alignment shift and transition area. The minimum setback requirements would not be met by the seven lots adjacent to the east side of the transition area; therefore, total purchase of the lots would be necessary. No additional west side acquisition would be required for the 100-foot-wide right-of-way. The 116-foot-wide alternative would require a minor amount of additional right-of-way from the west side of the proposed roadway. The right-of-way acquisition costs for this alignment change are estimated to be $158,100 for the 116-foot-wide corridor and $154,900 for the 100-foot-wide corridor.

Any eastward alignment shift would create a hazardous traffic condition at the North 19th Avenue - Durston Road intersection due to the fixed location of the existing portion of North 19th Avenue. North-south traffic would be required to change direction as it passed through the intersection unless the south approach to the intersection was substantially modified. Such an operating condition is considered to be unsafe, and it is not prudent to consider this design option.

Two intersections along North 19th Avenue, including North 19th - Durston Road and North 19th - Oak Street, were evaluated and sized based upon the projected design year traffic volumes and the operational requirements of each intersection. Based upon the capacity analysis conducted for the North 19th - Durston Road intersection at the southeast corner of the Smith farm historic site, it was determined that North 19th must be a four-lane roadway at this location to function at a Level of Service C or better in the design year. The undivided two-lane facilities (Alternate 2 and Alternate 5) will require the construction of approximately 1,200 feet of transition to accommodate the required approach and exit lanes. Similar transitions are required at the North 19th - Oak Street intersection. Although signalization will not be initially required at this intersection, it will be necessary by the design year. Since the total length of North 19th Avenue (Durston Road to Oak Street) is 2,700 feet, construction of the required transitions will result in less than 300 feet of intervening two-lane roadway. The projected design year traffic (20,000 vehicles per day) and the fact that transitions would be required over most of the section length limit the practicality of constructing the undivided two-lane alternatives.

The divided two-lane versions of Alternatives 3 and 4 will also require two approach and two exit lanes at the North 19th - Durston Road intersection. This requirement may be satisfied if a left-turn bay is constructed in the median on the north approach to the intersection. Although the divided two-lane alternatives offer operational and safety benefits relative to the undivided two-lane roadways, design year traffic on North 19th Avenue is anticipated to require the construction of a four-lane facility between Durston Road and Oak Street.

All of the four-lane construction alternatives considered for North 19th Avenue will operate effectively through the design

year for this project. It is anticipated that North 19th Avenue from West Main to Durston will be restriped to accommodate four travel lanes by the design year. The two traffic lanes for each direction provided by these alternatives and the fact that left turn bays may be incorporated into the medians will provide continuity over the length of the facility and allow the facility to operate at a desirable level of service. The relative difference in the level of service provided by either four-lane alternative is minimal. The slightly wider median and shoulders provided by Alternative 3 offer some operational benefits; however, the right-of-way necessary for this alternative would require the taking of the Smith farmhouse and additional public expenses for right-of-way.

The "no build" alternative would require the project area to remain in its present undeveloped state, and North 19th Avenue would not be constructed. Several major segments of the local traffic network, most notably North Seventh Avenue, Durston Road, and Main Street, currently operate at undesirable levels of service. The delays and congestion currently experienced at several major intersections on these routes will only worsen as the design year traffic in Bozeman is realized. If roadway improvements are not implemented on North 19th Avenue and Oak Street, measures to increase the levels of service on North Seventh, Main Street, and Durston Road will be necessary. Traffic projections indicate average daily traffic on North Seventh Avenue and West Main Street may be approaching 50,000 vehicles and Durston may have volumes of 10,000 to 15,000 vehicles per day by the design year without the projects. Substantial improvements will be required to these traffic facilities before they will be capable of handling such traffic. These improvements would most likely be at a greater public expense than that required for Project M1299(1).

E. Mitigation

Project M1299(1), if constructed, will adversely impact the Smith farm historic property. Since the site derives its significance from the architectural style exhibited by the farmhouse and several attendant structures and the original environment of the farm has been altered by adjacent housing subdivisions, the setting of the farmhouse is not the primary consideration in impact mitigation. Therefore, the mitigating measures discussed in this section are addressed at impacts to the farmhouse structure and not its location.

Predications of design year exterior noise levels in the vicinity of the Smith farmhouse indicate that the FHWA noise abatement criteria for residential uses (70 dBA) will be exceeded by one to three dBA for all build alternatives. Several noise abatement alternatives, including realignment of the roadway; installation of a noise barrier or berm; and relocation of the farmhouse structure, were considered as means of mitigating project impacts. As previously discussed, realignment of North 19th Avenue is not a feasible mitigating measure due to the costs and design problems associated with such an

alternative. The installation of a noise barrier or berm adjacent to the Smith farmhouse is not practical due to right-of-way limitations and need for adequate sight distance in the vicinity of the Durston Road - North 19th Avenue intersection. The installation of a continuous noise barrier immediately adjacent to the farmhouse is likely to compromise the appearance of the structure and the integrity of the site. Relocation of the structure would mitigate noise impacts but is not considered to be a feasible mitigating measure at this time. The owner of the Smith farm property has indicated the farmhouse structure will be moved to another site on the property to accommodate the development of the Annie Subdivision.[7]

[7] Roger Smith in a personal communication October 16, 1985.

Potential impacts to the Smith farmhouse structure due to the placement of fill material adjacent to the structure will be avoided by the construction of a small retaining wall. The use of such a design feature in the farmhouse area will limit construction activities to the proposed right-of-way. The wrought-iron fence which parallels the proposed alignment of North 19th Avenue may be salvageable and could be reinstalled when the farmhouse structure is relocated at some time in the future. The impacts resulting from the loss of the cottonwood trees located along the eastern boundary of the site can be mitigated only through compensation.

All mitigation measures must be established and approved under a Memorandum of Agreement (MOA) between the Advisory Council on Historic Preservation, FHWA, MDOH, and SHPO. The MOA details the actions agreed upon by the involved parties to be taken to avoid, satisfactorily mitigate, or accept the adverse effects on the historic property. A MOA regarding the mitigation to impacts on the Smith farm property was ratified by the Chairman of the Advisory Council on July 25, 1986. The agreement stipulates that MDOH must contact the National Park Service Historic American Buildings Survey (HABS) to determine the level of documentation required for the structure and photograph it according to HABS standards. FHWA must ensure that all documentation is completed and accepted by HABS prior to moving or demolition of the structure. Copies of the photographs and a history of the property must be provided to the Montana Historical Society Library and the Bozeman Public Library.

F. Coordination

Preliminary coordination regarding the taking of property from the Smith farm historic site was undertaken with both the owner of the property and the State Historic Preservation Officer. The developer of the Annie Subdivision, which includes the Smith farm, has attended all public meetings regarding the project and was consulted several times during the preparation of the EIS and background studies. The State Historic Preservation Officer was supplied with a copy of the Cultural Resource Inventory for the project and all site survey forms early in the project.

A preliminary case report outlining impacts to the Smith farm historic property due to construction of the proposed project was prepared by the Department of Highways and submitted to SHPO for review and comment. By statute, the Department of the Interior (Office of the Secretary) is a consulting party on this Section 4(f) Evaluation and has provided formal comments based on the contents of the Draft Environmental Impact Statement. Other coordination with federal and state agencies, concerned groups, and the public resulted from the circulation of the Draft EIS and the public hearing process. Letters of coordination have been included in Appendix B or in the "Comments and Coordination" section of this EIS.

G. Concluding Statement

Based upon the above considerations, it is determined that there is no feasible and prudent alternative to the use of land from the Smith farm property and that the proposed action includes all possible planning to minimize harm to the Smith farm resulting from such use.

Part VI: Mitigating Measures

There are a number of mitigating measures that will be undertaken to reduce the impacts of the proposed roadway construction projects. These measures are summarized in the following narrative.

A. Vegetation

During construction, much of the topsoil and vegetative cover will be stripped from the right-of-way due to earthwork operations. The topsoil will be removed, stockpiled, and used to cover cut and fill areas for revegetation. The establishment of strict construction limits and the removal of only the necessary vegetation during clearing activities will prevent unnecessary disturbance of roadside vegetation. The revegetation of disturbed right-of-way areas with grasses will be in accordance with Montana Department of Highways construction specifications for roadside development.

B. Water Resources

The impacts to water resources primarily involve the potential water pollution associated with stormwater runoff. Runoff will be effectively captured through the inlets, manholes, and piped connectors. Since pollutant modeling indicates that primary treatment of the majority of stormwater may be necessary to safeguard the water quality of receiving watercourses, provision of stormwater detention facilities are proposed. Two locations for stormwater facilities have been identified by the City of Bozeman in the Oak Street area. It is anticipated that the design of any drainage facilities developed for the proposed North 19th Avenue - Oak Street project would be consistent with the City's plans for the area. Along Kagy Boulevard basic detention for the majority of stormwater runoff will take place in naturally occurring drainages and by overland flow.

The existing Farmer's Canal will require relocation in construction along North 19th Avenue between Durston Avenue and Oak Street. As was done in the recently constructed portion of North 19th Avenue south of Durston Avenue, the open canal will be replaced with a piped, underground conduit. An outlet structure will be placed north of Oak Street allowing the flow to resurface. The conduit will jointly serve to collect roadway inlet drainage along this portion of North 19th, and a structure is recommended at the north end to divert higher storm flows to the proposed municipal detention pond at the west end of Oak Street.

It should be noted that if a phased approach to construction of the roadway is used, consideration must be given to the scheduling of installation of storm drainage facilities. A contiguous drainage system should be maintained, and adequate

outlets for phased facilities must be provided or the entire drainage system must be installed at the same time. These factors should be considered during facilities design. If circumstances do not provide for the construction of the stormwater detention ponds by the time roadway construction has been completed, alternative detention facilities should be provided. A cooperative project between MDOH and the City of Bozeman could be considered to construct the necessary facilities.

C. Wetlands

The construction of Kagy Boulevard will cross an intermittent stream which feeds a small wetland area located north of the proposed alignment. Construction of the roadway will require that right-of-way be cleared and minor amounts of fill material be placed in and near the wetland area. Since the location and design features of the roadway will not allow new wetlands to be created or existing wetlands to be enhanced within the highway right-of-way, mitigation efforts will be focused on measures to avoid draining the marsh area. All culverts and drainage facilities will be installed at elevations that will maintain intermittent stream flows. Provisions will be included to establish strict conservation limits in the vicinity of the drainage and to promptly revegetate any areas disturbed by construction to minimize surface erosion. Intermittent stream flows will be accommodated through the construction phase of the project.

D. Noise

Based upon the noise studies conducted for this EIS, it was determined that FHWA noise abatement criteria for residential land uses (70 dBA) will be exceeded in the design year at locations within 145 feet of the proposed centerline of North 19th Avenue. Noise abatement criteria will not be exceeded at any other locations in the Oak Street or Kagy Boulevard project areas. Since much of the land adjacent to North 19th Avenue is presently undeveloped, impact discussions and mitigation will be limited to existing structures likely to be affected by noise. The right-of-way acquisition for the proposed project will not relocate the one residence and 17 mobile homes in Cover Wagon Mobile Home Park that may experience noise impacts by the design year.

Measures to mitigate noise impacts may be utilized during construction and after the facilities become fully operational. Measures to reduce the short-term adverse impacts likely to be experienced during construction were previously discussed in Section G of Part IV, "Environmental Consequences", of this report. Long-term noise impacts may be reduced through the implementation of three types of mitigating measures which include: control of the noise source; control of the noise path; and control of the noise receiver. These categories are discussed in the following narrative.

Measures to control the noise source are limited to traffic management policies that would restrict the use of North 19th Avenue - Oak Street by trucks or other noisy traffic to particular hours of the day or prohibit such traffic altogether. Implementation of such a policy would require truck traffic to continue the use of North Seventh Avenue and Main Street as major routes through the city. Although this situation may reduce noise impacts in the North 19th Avenue area, beneficial operational and traffic safety impacts to North Seventh Avenue and Main Street provided by the proposed project would be minimized or negated. The local government has the responsibility for the implementation of any type of traffic use ordinance on North 19th Avenue - Oak Street.

One of the most effective means of providing noise relief is with the use of noise barriers, typically walls or berms, which are designed to block the line of noise transmission from the roadway to nearby locations. In order to afford a noticeable reduction in noise levels, the barrier or berm must be continuous between cross streets and at least ten feet in height. Noise barriers are most often constructed of wood, metal, concrete, masonry or earth. Unless special care is taken regarding the design of the noise barrier, the structure may be aesthetically unappealing.

A barrier installed along the west and north sides of the Covered Wagon Mobile Home Park would effectively mitigate noise impacts in the residential area since a continuous barrier could be erected between the mobile home park's access locations at North 19th Avenue - Steven Street and Oak Street - North 17th Avenue. However, due to the mobile home park's location at the southeast corner of the North 19th Avenue and Oak Street intersection and the required height of the barrier, hazardous sight distance conditions would be created for stopped traffic on the south and west approaches to the intersection. The resultant sight distance limitations would not be consistent with AASHTO policies on geometric design of intersections. Therefore, the use of a noise barrier in this location is not considered to be reasonable or feasible.

Modification or control of the noise receiver in the area of the roadway is also an effective means of abating noise impacts. Existing buildings may be modified with additional insulation or air conditioning to lessen noise impacts. To date, highway funds have not been expended for this type of noise abatement measure on Federal-Aid projects in Montana.

Since much of the property adjacent to North 19th Avenue and Oak Street is currently undeveloped, one of the most effective means of noise control lies in the regulations that govern the use of such properties. Extensive review of development proposals to ensure compliance with land use planning and zoning regulations may help to alleviate problems before they develop. The development of less sensitive land uses along the North 19th Avenue - Oak Street corridor is encouraged to minimize future noise impacts.

E. Utilities

Prior to or during construction, all conflicting utilities within the North 19th Avenue - Oak Street and Kagy Boulevard project corridors will be relocated. The City of Bozeman and private utilities will be contacted during the design phase of the projects to determine the existing utility locations and to formulate a relocation plan for adversely affected facilities. Such early coordination will allow each public or private utility to identify any necessary system modifications and determine where the facilities should be placed to avoid further conflicts with road building activities. All existing and required utility poles will be placed behind the new sidewalk areas to enhance the safety and appearance of the roadway.

F. Relocation Assistance

The proposed improvements to North 19th Avenue, Oak Street, and Kagy Boulevard will require additional right-of-way along the routes and will require the taking of one residence and one business. The Montana Department of Highways will extend relocation services to all displaced persons under the provisions of the Highways Relocation Assistance Program. This program, which is administered by the Chief of the Right-of-Way Bureau, requires a 90-day notice to displacees and provides supplemental housing payments, interest differential payments, moving costs, advisory assistance, and other services to individuals displaced by the project. These payments are in addition to the compensation paid for the acquired right-of-way.[1] A Relocation Plan and actual appraisals of properties will be prepared at the time the final roadway alternatives have been selected and authorized. Housing of last resort will be provided should it become necessary.

1 "Rules for Relocation Assistance", Montana Department of Highways, p. 10.

The Department of Highways typically maintain pertinent information regarding relocation assistance such as inventories of replacement dwellings, current financing data, and brochures explaining the relocation program. Individuals may contact the Right-of-way Bureau in Helena for further information.

G. Archaeological and Historical

The cultural resource inventory conducted for Projects M1299(1) and M1212(4) identified one property, the Smith farmhouse and several attendant structures, that is eligible for inclusion in the National Register. The construction of North 19th Avenue will require a small retaining wall be placed in the area adjacent to the farmhouse to contain fill material necessary to match the existing elevation of the North 19th Avenue - Durston Road intersection. Probable noise impacts to the farmhouse could be mitigated by relocating the structure; however, relocation is not considered to be a feasible measure at this time. The owner of the property has

indicated his intentions to move the structure to another location on site at some future date to accommodate the development of a major subdivision. A Memorandum of Agreement between the Advisory Council on Historic Preservation, FHWA, MDOH, and SHPO outlining the specific mitigation required for impacts to the Smith farmstead was ratified in July, 1986. This agreement stipulates that MDOH must photograph the Smith farmstead and document the structure in accordance with the National Park Service Historic American Building Survey (HABS) requirements. FHWA must ensure that the documentation is completed prior to moving or demolition of the structure. Copies of photographs and a history of the property must also be transmitted to the Montana Historical Society Library and the Bozeman Public Library.

List of Preparers

The Montana Department of Highways and the Federal Highway Administration are responsible for the preparation of this Environmental Impact Statement. Due to the scope of the project and the wish to expedite the study, consultants were retained to provide preliminary design services and to assess the impacts of each roadway alternative selected for consideration. It is the responsibility of the consultant to prepare the EIS and coordinate the study with cooperating state and federal agencies. The Montana Highway Department has the responsibility for formulating all conclusions and recommendations contained in this study.

The prime consultant is Robert Peccia & Associates, Inc., Engineers, Planners and Designers, located in Helena, Montana. The firm was responsible for providing much of the transportation, civil and environmental engineering analysis completed for this study. Robert Peccia & Associates also retained the services of several other subcontractors to provide additional expertise for various segments of the EIS. Lisa Bay Consulting, based in Helena, was retained to inventory existing socio-economic conditions in the project areas and assess the impacts due to the construction of the proposed projects. OEA Research, also a Helena-based firm, was retained to provide studies and impact assessments regarding vegetation and wildlife within the project limits. Historical Research Associates of Missoula performed field surveys and assessed the impacts of construction on the identified historic and cultural resources of the study areas.

The Montana Department of Highways provided estimates for right-of-way and relocation costs, existing traffic counts and data, measurement of existing noise levels, preliminary right-of-way and design data for the projects, previous correspondence, and work files. Federal Highway Administration personnel also provided technical expertise and policy guidance during the preparation of this document. The primary representatives of the state and federal agencies who were responsible for providing technical support and review comments on this EIS are as follows:

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Gordon Larson, P.E., Supervisor, Consultant and Safety Design Section, Preconstruction Bureau
Mark Leighton, P.E., Consultant and Safety Design Section, Preconstruction Bureau
Mike Davis, Supervisor, Urban Transportation Section, Planning and Statistics Bureau
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Federal Highway Administration

William Dunbar, P.E., Environmental and Design Engineer, Montana Division
Dale Paulson, Environmental and Design Engineer, Montana Division
Mark Zitzka, Preconstruction Engineer, Montana Division

Qualifications of the persons who were responsible for preparing this EIS are as follows:

Robert Peccia & Associates, Inc.

Robert J. Peccia, Transportation Engineer. Mr. Peccia is a registered Professional Engineer in Montana and California, and is a certified Planner-in-Charge in Montana.

Mr. Peccia has a Bachelor of Science degree in Civil Engineering from Montana State University and has also done graduate work at Montana State University and California State College in Los Angeles. He has 20 years of experience in civil engineering and design, transportation engineering, and environmental engineering. In recent years, Mr. Peccia has served as Project Manager for the Final Environmental Impact Statements for U.S. 2 between Hungry Horse and West Glacier and Reserve Street in Missoula, the Tenth Avenue South Improvement Plan and the Third Street Northwest Traffic and Safety Study in Great Falls. Mr. Peccia coordinated the project with the Montana Department of Highways and was responsible for editing and contract management.

Douglas E. Widmayer, Traffic and Transportation Engineer. Mr. Widmayer has a Bachelor of Science degree in Civil Engineering from Virginia Polytechnic Institute and State University and is a registered Professional Engineer in Montana. He has 10 years of experience as a design and traffic engineer. Mr. Widmayer has been Project Engineer on numerous recent projects, including the Helena Transportation Plan, the Missoula Transportation Plan, the Grand Teton National Park Traffic Safety and Engineering Improvements Study, and the Tenth Avenue South and Third Street Northwest traffic studies in Great Falls. Mr. Widmayer was primarily responsible for preliminary design work, level of service and capacity analysis, and noise studies for this project.

Alden G. Beard, Environmental Engineer. Mr. Beard is a graduate of Iowa State University where he received his Bachelor of Science degree in Civil Engineering and a Master of Science degree in Sanitary Engineering. Mr. Beard is a registered Professional Engineer in Montana and has worked on a variety of water and wastewater treatment and handling projects since joining Robert Peccia & Associates. Mr. Beard's graduate work has afforded additional background in water resource management and environmental impact assessment. Mr. Beard was responsible for the water quality analysis and for the assessment of potential impacts on utility systems in the area with an emphasis on storm drainage facilities. Mr. Beard was the Project Manager for the Bozeman Arterials EIS and moderated the public meetings held during the course of the project.

Francis J. Kerins, Jr., Mathematician and Mining Engineer. Mr. Kerins is a graduate of Carroll College, where he received his Bachelor of Arts degree in Mathematics, and the Columbia University School of Engineering and Applied Science, where he received a Bachelor of Science degree in Mining Engineering. He is currently completing a Master of Science degree in Mining Engineering at the Montana College of Mineral Sciences and Technology in Butte. Mr. Kerins was responsible for evaluating existing air quality and computer modeling to determine air quality impacts for each of the alternatives.

Daniel M. Norderud, Transportation Planner. Mr. Norderud has a Bachelor of Science degree in Earth Sciences, Planning Option from Montana State University. Mr. Norderud has seven years of experience in the preparation of comprehensive, transportation, and environmental planning projects. Recent activities include extensive involvement in the preparation of: Final Environmental Impact/Section 4(f) Evaluations for U.S. Highway 2 improvements between Hungry Horse and West Glacier and for Reserve Street in Missoula, the Grand Teton National Park Traffic Safety and Engineering Improvements Study, and high hazard accident locations studies for several Montana counties. Mr. Norderud was responsible for preliminary design layouts of each alternative, construction cost estimates, preparation of the Section 4(f) Evaluation, and technical writing and editing of the Bozeman Arterials EIS.

Mary J. Espeseth, Typist. Ms. Espeseth is the Administrative Secretary of Robert Peccia & Associates and is responsible for the preparation of all reports, proposals, and specifications for the firm. Her previous experience includes positions as a legal secretary, legal assistant, and as office manager for a mechanical contracting firm. Ms. Espeseth was responsible for typing and formatting the Bozeman Arterials EIS.

Nicholas L. Ladas, Graphic Designer. Mr. Ladas has a Bachelor of Fine Arts degree in Graphic Design and Painting from Montana State University. Mr. Ladas has previous work experience with IBM which included both graphic and industrial design activities. Mr. Ladas was responsible for graphic design of report figures, report layout, and preparation of graphics for public presentations for the EIS.

Lisa Bay Consulting

Lisa Bay, Socio-Economic Consultant. Ms. Bay has a Bachelor of Arts degree in Environmental Planning from the University of California at Santa Cruz. Ms. Bay has ten years experience as an independent socio-economic consultant in both the Santa Cruz County Planning Department in California and as an Associate Planner/Transportation Coordinator for Helena and Lewis and Clark County. Ms. Bay specializes in environmental assessments, economic base studies, and land use planning. Ms. Bay was responsible for assessing impacts to the socio-economic conditions of the project areas with a special emphasis on relocation and its impacts.

OEA Research

Chris Hunter, Limnologist. Mr. Hunter has a degree in Biology from the University of California, Santa Barbara, and a Masters degree in Zoology/Limnology from the University of Montana. Mr. Hunter is the general manager of OEA Research and has more than ten years experience in limnology and other water resource related studies. Mr. Hunter has also served as an Environmental Planner for the Montana Department of Natural Resources and Conservation and as Director of the Flathead 208 Project, a water quality program for a three-county area in western Montana. Mr. Hunter was responsible for water quality and vegetation studies specific to each project area.

Steve Gilbert, Wildlife Biologist. Mr. Gilbert has a degree in Wildlife Biology from the University of Montana. Mr. Gilbert's responsibilities with OEA Research include supervision and quality assurance of all wildlife-related field work and coordination of photographic services. Mr. Gilbert has 13 years of experience in wildlife monitoring studies and impact assessment on wildlife resources. Mr. Gilbert was responsible for the wildlife investigations conducted for this study.

Historical Research Associates

T. Weber Greiser, Senior Archaeologist. Mr. Greiser holds Bachelors and Masters degrees in Anthropology from the University of New Mexico and has a Ph.D. in Anthropology from the University of Colorado. Mr. Greiser has served as the Vice President and Treasurer of Historical Research Associates since 1982 and is the principal investigator for the firm. Mr. Greiser has 13 years of professional experience as an archaeologist and worked throughout the western United States as project manager/principal investigator on numerous cultural resource inventories.

Janene M. Caywood, Archaeologist. Ms. Caywood has a Bachelor of Science degree in Anthropology from Oregon State University and a Masters degree in Anthropology from the University of Montana. Ms. Caywood has six years of professional experience as an archaeologist and has conducted numerous archaeological and historical resource inventories throughout Montana, Wyoming, and North Dakota. Ms. Caywood served as project archaeologist and conducted on-site surveys of cultural resources for the North 19th Avenue - Oak Street and Kagy Boulevard project areas.

Daniel F. Gallacher, Senior Historian. Mr. Gallacher has a Bachelor of Arts degree in Sociology from the University of Colorado and a Masters degree in History from the

University of Montana. Mr. Gallacher has five years experience as the principal investigator and historian for Historical Research Associates and has served as a faculty affiliate with the University of Montana, Department of History since 1983. Mr. Gallacher conducted the historical research and evaluation of the historic sites identified in this EIS. The research performed for this study included a search of the Homestead Entry Case Files from the Federal Records Center in Suitland, Maryland, and an examination of Gallatin County files.

In addition to these individuals, members of the Bozeman Technical Advisory Committee (TAC) and the Bozeman Policy Coordinating Committee (PCC) assisted in the development of the recommendations contained in this EIS. The following lists identify the membership of this committee and the agencies or groups they represent:

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Glossary

alignment: the ground plan of a highway

alluvium: unconsolidated sediments deposited by streams

ambient: existing background conditions

annual average daily traffic: a measurement of traffic derived by dividing the year's traffic by 365; abbreviated as AADT

aquifer: a stratum of water-holding rock, especially one that supplies water for wells, springs, etc.

attainment area: a designation for an area where air quality exceeds the national ambient air quality standards for a particular pollutant

attentuation: a reduction in severity or lessening in force

baseline: existing situation or conditions used for comparison with future projections

B-1: a water classification of the State Water Quality Bureau for water which is suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterflow and furbearers; and agricultural and industrial water supply. Parameters for this classification can be found in ARM 16.20.618, 9/30/80.

B-2: a classification by the Water Quality Bureau for water that is less stringent than the B-1 classification. Parameters for this water classification can be found in ARM 16.20.619, 9/30/80.

capacity: the maximum number of vehicles per unit of time that can be handled by a particular roadway component under the prevailing conditions

carry-out: air contaminants not dispersed in the atmosphere, absorbed by rain or snow and deposited on the ground near the source of the contaminants, or moved by wind to another location

CO: Carbon Monoxide, the most abundant pollutant in motor vehicle exhaust resulting from incomplete combustion within the vehicle engine

construction impact: a direct environment impact resulting from construction activities; these impacts are often temporary in nature (i.e., noise impacts generated by construction equipment)

dBA: a weighted scale reading in decibels giving a measurement of sound level

decibel: unit of noise measurement, a logarithmic measure of sound pressure

DEIS: Draft Environmental Impact Statement

design hourly volumes: determined by multiplying the average annual daily traffic by a percentage of the average daily traffic per hour expected for the design year. The selection of this volume is a compromise between the cost of the facility and the annual service provided by the facility.

design year: the year for which a particular facility is designed (usually 20 years from the date of construction)

dissolved solids: substances that are soluble in water but which remain as a residue when the water evaporates

DNRC: Montana Department of Natural Resources & Conservation

drop-off rate: a decrease in traffic noise levels proportional to an increase in distance from a roadway

effluent: discharged liquid, especially from septic tanks

EIS: Environmental Impact Statement

EPA: Environmental Protection Agency

fault: a fracture along which movement of rock along opposite sides occurs

FHWA: Federal Highway Administration

fluvial: concerning or pertaining to rivers or streams

fugitive dust: a type of particulate typically originating from street sanding or runoff-deposited silts which is reintroduced into the atmosphere through vehicle movement over the material

heavy metals: metals such as lead, zinc and mercury that can be toxic in small quantities

housing unit: a house, apartment, group of rooms or single room occupied or intended for occupancy as separate living quarters

infrastructure: the organizational structure of a community

L10: the level of sound exceeded ten percent of the time, or exceeded six minutes in a 60-minute time period

MDHES: Montana Department of Health and Environmental Sciences

MDOH: Montana Department of Highways

mitigation: the act of lessening the severity of impacts on the environment as a result of the implementation of a proposed project

model: a mathematical formula or computer program developed to represent selected future conditions within the study area. Models were employed in this EIS to predict air quality impacts, noise levels, water quality impacts, etc.

non-attainment area: an area currently under a state implementation plan where present particulate levels exceed national standards as determined from actual sampling

particulate: composed of distinct particles

PCC: Policy Coordinating Committee; serves as formal decision-making body regarding transportation planning within the community

pollutant load: the net mass of a pollutant or pollutants contained within a given volume of air or water

primary impact: an impact directly resulting from an action (i.e., increased noise levels during construction)

queuing: the relationship between vehicles within a line which may or may not be moving; often examined characteristics of this relationship include spacing, density and headway

scenario: a possible course of development

scoping: the process used to identify the significant issues that should be addressed and the degree to which they should be addressed in the development of an Environmental Impact Statement

secondary impact: an impact indirectly resulting from an action (i.e., increased development in an area after access to the area is improved)

service level: a measurement of how well a highway is handling traffic; what speeds, delays and restrictions to traffic flow exist

suspended solids: small particles of solids that do not readily settle out of water (i.e., clay particles)

TAC: Technical Advisory Committee; serves as an advisory body to PCC regarding transportation-related matters

thirtieth highest hourly volume: a standard design criteria derived from the 30th highest of all hourly volumes ranked from low to high

total suspended particulates (TSP): a measure of the concentrations of particulates held in suspension in a specified volume of air. TSP is a commonly used measure of air quality.

trace: a barely discernible amount or indication of some quantity

Appendix A: Technical Studies

As part of the preparation of the Environmental Impact Statement/Section 4(f) Evaluation for projects M1299(1) and M1212(4), several technical studies were done to provide data on subject areas where insufficient information was presently available. Many of these studies were considered too lengthy and detailed to include in this EIS and are on file and available for review at the Montana Department of Highways office in Helena. A brief description of each of these studies follows.

A. Traffic and Capacity

Projections of future traffic on the Bozeman street network were obtained through the use of the computer traffic model developed for the Bozeman Transportation Plan. The MDOH traffic model was utilized to project future traffic volumes without these projects, with the project, and with the projects and an I-90 interchange at North 19th Avenue. The results of this computer modeling is on file with the Montana Department of Highways in Helena.

Based on the projected design year traffic volumes and the operational characteristics of each alternative, capacity was evaluated for both projects. Techniques outlined in the 1985 edition of the Highway Capacity Manual and the Signalized Intersection Capacity Analysis (SICA) computer program were utilized to identify the level of service and assess the operational characteristics of proposed designs for major intersections encompassed by the project areas. The SICA program was developed by the FHWA to facilitate capacity analyses in urban areas. The results of the capacity analyses are also on file with the Department of Highways in Helena.

B. Preliminary Design and Cost Analysis

Preliminary design for the various alternatives was conducted by Robert Peccia & Associates to establish the physical features of each alternative for analysis purposes. These features included alignment, grades, pavement widths, turning lanes, medians, and irrigation and storm drainage facilities. Construction costs for each alternative were developed based upon anticipated quantities and 1984 unit prices from the Montana Department of Highways bid tabulations.

C. Air Quality Analysis

An air quality analysis was conducted by Robert Peccia & Associates using information available from the Air Quality Bureau, Montana Department of Health and Environmental Sciences and existing reports regarding Gallatin Valley air quality. A computer model, CALINE3, was utilized by the consultant to predict carbon monoxide levels for each of the roadway alternatives. Predicted levels of total suspended particulates were calculated using methodology developed for the Air Quality Bureau by the Midwest Research Institute. It should be noted that these predicted levels of air pollutants are attributable only to future traffic volumes on North 19th Avenue, Oak Street, and Kagy Boulevard. In order to obtain reasonable estimates of the impact of each alternative on the air quality of the study area, the predicted pollutant levels of each alternative were added to estimated background pollutant levels for the project study area.

D. Noise Analysis

Actual noise level measurements were taken at numerous locations along the perimeter arterial system using Montana Department of Highways noise monitoring equipment. Sound

level readings were taken at varying distances from the proposed project centerlines in order to monitor ambient noise levels and provide a basis for computer modeling of future conditions. The consultant utilized the Federal Highway Administration's noise level modeling techniques using existing and projected traffic composition to estimate and compare noise level readings for each alternative.

E. Water Quality Investigations

Water quality studies were conducted by Robert Peccia & Associates using information available from the Montana Department of Health and Environmental Sciences "STORET" data bank and other available sources of local water quality data. The storm drainage analysis was based upon preliminary design plans developed by the Consultant. Estimates of future water quality impacts resulting from the construction of the build alternatives were based upon Federal Highway Administration modeling techniques. Calculations and background information are available for review.

F. Socio-Economic Studies

Socio-economic studies were conducted by Lisa Bay Consulting of Helena, Montana. This firm relied heavily upon personal interviews, census data, and available documentation of social and economic conditions in Bozeman. In addition, Montana Department of Highways personnel were extensively consulted regarding right-of-way and relocation impacts.

G. Other Studies

Numerous other technical studies including archaeological and historical research, geology and soils, fish and wildlife, transportation, recreation, etc. were also conducted as part of this EIS. These studies and other background information are available for review at the Montana Department of Highways office in Helena.

Appendix B: Letters of Consultation

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Federal Building, Room 3035
316 North 26th Street
Billings, Montana 59101-1396

IN REPLY REFER TO:

ES

February 17, 1984

Date Rcvd. Preconst. 2/21/84

Act	Info	MAIL ROUTE	Attach	Initial
		30		
		30 Eng. Specialties		
		31 Contract Plans		
		32 Loc. Road Design		
		33 Environment		
		34 Hydraulic		
		35 Surfacing Design		
		36 Traffic		
		37 Pub. Hearing		
		38 Photogrammetry		
		39 Consultant Design		
		Kopp		
		File		

Federal Aid Urban Route 1212
Kagy Blvd. - 19th to 3rd (M 1212(4)

Mr. Stephen C. Kologi, P.E.
Chief, Preconstruction Bureau
Montana Department of Highways
2701 Prospect
Helena, Montana 59620

Dear Mr. Kologi:

We received your letter dated January 26, 1984, and the accompanying photomosaic of the Montana Department of Highways' intention to further the development of Federal Aid Urban Route 1212 (RE: M1212(4), Kagy Blvd. - 19th to 3rd) on the southwest edge of Bozeman.

It appears from the photomosaic that most of the area involved is tilled farmland with very little shrubby vegetation. One small drainage area traverses the area but appears to support only a narrow band of vegetation. Due to the location of the project, land use, human disturbance, and general lack of wildlife habitat, it is our opinion the project will not result in significant impacts to wildlife resources. For the same reasons, we do not expect the project to affect any federally-listed threatened or endangered species.

If other information comes to our attention which may indicate concerns, we will update our comments. We appreciate the opportunity to comment on the proposed project during the early planning stages.

Sincerely,

John G. Wood
Field Supervisor
Ecological Services

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Endangered Species, Field Office
Federal Bldg., U.S. Courthouse
301 South Park
P.O. Box 10023
Helena, Montana 59626

IN REPLY REFER TO:
M.17(I)

March 21, 1985

Mr. W.S. Dunbar
Project Development Engineer
Federal Highway Administrtion
301 So. Park
Mail Drawer 10056
Helena, MT 59626

Dear Mr. Dunbar:

Thank you for your March 4, letter on the proposed Beltview Interchange (IR 15-4(63)191) and the 19th Avenue - Kagy Boulevard - Oak Street (M 1212(4) & M 1229(1)). Bald eagles (Haliaeetus leucocephalus) and other large raptors may migrate through the Beltview Interchange project area. If project activities will necessitate the relocation of powerlines, we recommend that such powerlines be raptor proofed according to the specifications provided in "Suggested Practices for Raptor Protection on Power Lines - The State of the Art in 1981". Contingent upon incorporation of this recommendation, we concur that the two subject projects will not affect endangered species.

Please contact Carol Taylor of my staff at FTS 585-5225 if we can be of further assistance. We appreciate your efforts to meet our joint responsibilities under the Endangered Species Act.

Sincerely,

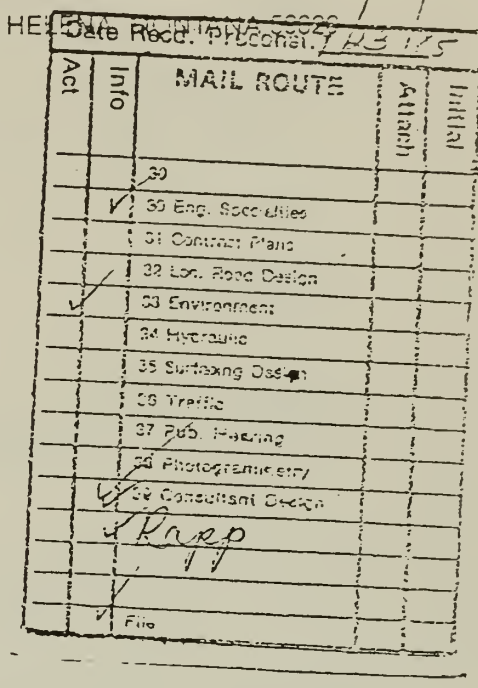
Wayne G. Brewster
Field Supervisor
Endangered Species

cc: ES, Billings, MT
Mont. Dept. of Highways (Garrett)

MONTANA HISTORICAL SOCIETY

HISTORIC PRESERVATION OFFICE

225 NORTH ROBERTS STREET • (406) 444-4584 • HE[illegible]
444-7715



September 20, 1985

Stephen C. Kologi, P.E.
Chief-Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59620

RE: Proposed Kagy Boulevard extension
M1212(4)

North Avenue extension
M1299(1)

Dear Steve:

Thank you for the opportunity to review cultural resource inventory work completed for the projects identified above.

We concur with the consultants' finding that 24GA719 does not qualify for listing in the National Register of Historic Places--that it does not possess sufficient design qualities or associations to meet the Criteria of Significance.

We can offer a tentative reading for you on the eligibility of 24GA718, but are feeling fairly shaky about the basis for any decision. The consultants' case for the eligibility of the Smith Farm is based solely on architectural qualities, as currently written. In the context of the town of Bozeman and in review of limited farmstead inventory conducted by Museum of the Rockies two years ago, this property would not appear to possess "unique" architectural qualities. And, the information gathered and presented to date on the Smith family neither makes a case for or against the importance or role that the family may have played in the community. However, in terms of architecture, we think it inappropriate to compare this property with buildings in Bozeman itself. Likely it belonged to a rural community or subdivision that does become a reasonable basis for comparison. Jim McDonald and his staff have recently conducted a reconnaissance level inventory of buildings in the portion of Gallatin County outside Bozeman that falls within the jurisdiction of the Bozeman Planning staff. We talked with Jim. Based on his own driving in the area, he believes that this property and its planned design are distinctive--with few comparable structures of that deliberate design. He plans on gathering and sending to us in the near future the full reconnaissance level materials (they will not include historical information). We would be glad to review

that material and if you can wait for a final judgment of the property, make it at that time. If you need our judgment now, I believe the information available to date supports a finding of eligibility.

Please call if you have questions.

Sincerely,

Marcella Sherfy,
State Historic Preservation Officer

State Historic Preservation Office
Montana Historical Society
Mailing Address: 225 North Roberts • Helena, MT 59620-9990
Office Address: 102 Broadway • Helena, MT • (406) 444-7715

January 16, 1986

Stephen C. Kologi, P.E.
Chief-Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59620

RECEIVED
ROBERT PEDEN & ASSOCIATES

RE: M 1299 (1)
N. 19th Avenue and Oak Street Extension
Bozeman

Dear Steve:

Thanks for the opportunity to comment early on your draft preliminary case report for the project identified above. I'm glad to provide you with our comments at this time. I believe that we will need to consult on this one again.

Based on some additional information from Matt Cohen, the new Preservation Officer for Bozeman who works within the Bozeman City/County Planning Office, we continue to concur in the eligibility of the Smith Farm (24GA718) for listing in the National Register of Historic Places. Matt's review of that area indicates that this property is of fairly startling architectural distinctiveness for this rural area outside Bozeman.

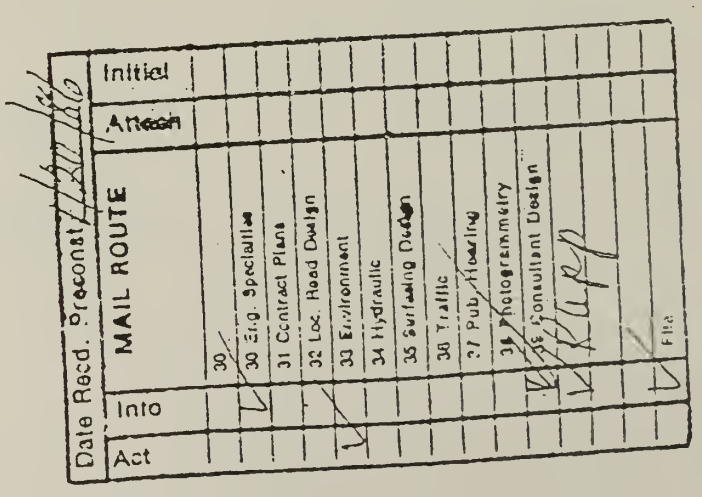
Also, our consultation with that Bozeman are planning staff indicates that area planners and city officials do have major questions about the alternative chosen for this project on the basis of both cost and size. We learned that they plan to meet with MDOH officials within the next two weeks. Given the importance of the Smith Property and, in our judgment, the importance of seeing whether alternatives exist to road construction that would come to the foundation of the house (thus really encouraging the owner to move it), I would like to postpone final consultation on this until your meeting with community officials and urge you to incorporate our concern for the Smith Farm into your discussions with the community and your development of alternatives that satisfy the traffic requirements on a less costly or impacting scale.

Please call if you have questions.

Sincerely,

Marcella Sherfy,
State Historic Preservation Officer

cc: Matt Cohen



Advisory
Council On
Historic
Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

JUL 28 1986

Mr. W.S. Dunbar
Project Development Engineer
Montana Division, Region VIII
Federal Highway Administration
301 South Park
Mail Drawer 10056
Helena, MT 59626

REF: Memorandum of Agreement for the North 19th Avenue & Oak Street Extension (M1299(1)), Bozeman, Montana

Dear Mr. Dunbar:

The enclosed Memorandum of Agreement has been ratified by the Chairman of the Council. This document constitutes the comments of the Council required by Section 106 of the National Historic Preservation Act and the Council's regulations. A copy of the ratified Agreement has been sent also to the Montana State Historic Preservation Officer.

The Council appreciates your cooperation in reaching a satisfactory resolution of this manner. We look forward to continuing to work with you on future projects.

Sincerely,

Thomas F. King
Director, Office of Cultural
Resource Preservation

Enclosure: MOA

Date Recd. Preconst. 7/31/86

Act	Info	MAIL ROUTE	Attach	Initial
		30		
		30 Eng. Specialties		
		31 Contract Plans		
		32 Loc. Road Design		
		33 Environment		
		34 Hydraulic		
		35 Surfacing Design		
		36 Traffic		
		37 Pub. Hearing		
		38 Photogrammetry		
		39 Consultant Design		
		RO pf		
		File		

MEMORANDUM OF AGREEMENT
SMITH FARMSTEAD

WHEREAS, the Federal Highway Administration (FHWA) proposes to assist in funding construction of North 19th Avenue in Bozeman, Montana; and

WHEREAS, the FHWA has determined that the highway undertaking will have an effect on the Smith Farmstead, a property probable eligible for inclusion on the National Register of Historic Places, and has requested the comment of the Advisory Council of Historic Preservation pursuant to Section 106 of the National Historic Preservation Act (16 USC 470) and its implementing regulations "Protection of Historic and Cultural Properties" (36 CFR 800).

NOW, THEREFORE, the FHWA, the Montana Historic Preservation Officer, and the Advisory Council on Historic Preservation agree that the undertaking shall be implemented in accordance with the following stipulation in order to take into account the affect of the undertaking on historic properties.

STIPULATION

FHWA will insure that the following measure is carried out:

The Smith Farmstead will be photographed according to HABS standards. MDOH will contact the National Park Service (HABS) to determine the level of documentation required for the structure. FHWA will insure that all documentation is completed and accepted by HABS prior to moving or demolition. In addition, copies of these photos and a history of the property will be provided to the Montana Historical Society Library and the Bozeman Public Library.

Execution of this Memorandum of Agreement evidences that the FHWA has afforded the Council a reasonable opportunity to comment on the highway undertaking and its effects on historic properties and that the FHWA has taken into account the effects of its undertaking on historic properties.

Agency Official "/ROGER K. SCOTT Division Administrator by WS Dunbar Date 6-6-86

State Historic Preservation Officer _____ Date 6-19-86

Executing Executive Director, ACHP _____ Date 7/24/86

Chairman, _____ Date 25 July 86

MR/pz/3g

Appendix C: References

Air Quality

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Comments and Coordination

A. Opportunities for Comments

Recognizing that this project is of interest to many people in the Bozeman area, a number of opportunities for comment were provided at both an early stage and throughout the development of this EIS. The major public notices, meetings, and opportunities for comment are listed as follows:

- Notice of Intent to Conduct an EIS published in the Federal Register on February 7, 1985.
- Scoping meetings to discuss the significant issues to be addressed in the EIS held during the afternoon and evening of February 20, 1985.
- Meetings to discuss alternatives that were identified and considered appropriate for the project held during the afternoon and evening of April 10, 1985.
- Meetings on preliminary findings for some of the technical studies held during the afternoon and evening of August 14, 1985.
- Public Hearing for Draft Environmental Impact Statement (DEIS) and Location and Design held April 23, 1986.
- Government agency and public review of the DEIS through May 5, 1986.

B. Public Comments

As a result of the public workshop sessions and the evening meetings held in February, April, and August, 1985, numerous oral and written comments on the projects have been received. The majority of these comments were received at the February, 1985, meetings which were held to solicit input to help identify significant and non-significant issues. The primary concerns expressed by the participants at the scoping meetings included extension of North 19th Avenue to Baxter Lane and I-90; traffic impacts on the existing street system; provisions for truck traffic on North 19th Avenue - Oak Street; pedestrian and bicyclist facilities; and secondary development due to the completion of arterial links on the edge of the City of Bozeman.

Comments received at the meetings on alternatives in April, 1985, were primarily related to the extent of right-of-way acquisition; specific design features of the alternatives; and the timing of the proposed projects. Very few comments specified a preferred roadway width; however, several did express the need for initial two-lane facilities that could easily be upgraded to four-lanes as traffic increases in the future. Supplemental comments reiterated previous concerns about extending 19th Avenue to Baxter Lane; provisions for truck traffic; and disruption of residential areas.

Public input at the August 14, 1985, workshop and evening meetings centered on traffic impacts on North Seventh and Baxter Lane; the necessity for pedestrian and bicyclist facilities on North 19th Avenue - Oak Street; street lighting; and development proposals for the northwest portion of Bozeman. Several comments were supportive of specific design alternatives. Virtually all of those that attended the meetings felt that the proposed projects are necessary to relieve traffic pressures on major streets in Bozeman.

C. Public Agency Comments and Coordination

Several federal agencies were invited to be cooperating agencies for this project because of jurisdiction over elements of the EIS or special interest in important areas of study to be included in this report. The agencies that were invited to be cooperating agencies included:

U.S. Department of Housing and Urban Development
U.S. Environmental Protection Agency

Although these federal agencies did not participate as cooperating agencies for this project, review comments will be solicited from each and incorporated into the EIS. Comments have been received from the U.S. Department of the Interior, Fish and Wildlife Service regarding Section 7(c) of the Endangered Species Act and have been incorporated into the DEIS.

The State Historic Preservation Officer assisted in evaluating the existing cultural resources in the project area and in determining the impacts that the proposed project would have on such resources. The Montana Department of Fish, Wildlife and Parks was also consulted and determined that the proposed project would not conflict with any Department interests. These state agencies, along with several others, provided reviews, comments, and technical information through the development of the EIS.

D. Public Hearing Comments and Responses

Approximately 30 people attended the Public Hearing, of which 11 people offered testimony. Comments were offered on several topics including: FAU funding priorities; construction of interim roadways on North 19th Avenue - Oak Street by private developers; the limited access policy and individual access requirements; and effects of the projects on the local traffic network. Comments at the public hearing were responded to by Dan Bartsch, Alden Beard, Joe Micheletti, and Ralph Zimmer. The principal comments and responses to each are summarized as follows:

Comment: Ron Glock, property owner at 321 North 17th Avenue. Mr. Glock asked if private construction of roadways on North 19th Avenue and Oak Street would result in a shift in priorities from North 19th - Oak Street to Kagy Boulevard. He also asked if North 19th Avenue and Oak Street would be developed to its ultimate design section prior to Kagy Boulevard construction. Concern was also expressed regarding the status, timing, and funding for other related projects and proposals (i.e., Valley Center Drive and a future I-90 at North 19th Avenue - Springhill Road).

Response: Ralph Zimmer stated that although TAC/PCC had discussed the possibility of reordering its priorities, no action has been taken to initiate such a revision. Mr. Zimmer speculated that once private improvements on North 19th Avenue and Oak Street were in place, it may be prudent for TAC/PCC to reassess its priorities for FAU funding. Mr. Zimmer further indicated that the MDOH Planning Bureau was evaluating alternate funding scenarios for Bozeman based on projected construction costs and stage construction options. The construction dates for the related projects are unknown at this time.

Comment: Don Stueck, home owner at 1220 D North 8th Avenue. Mr. Stueck owns a home with a garage fronting on Oak Street and was concerned that the limited access policy proposed for the project would not allow him to access his property. He also questioned the ease of relocating overhead power lines and other

utilities that exist along the proposed Oak Street alignment and requested information on the status of a future Bozeman I-90 interchange.

Response: Joe Micheletti stated that right-of-way agents would contact all landowners affected by the project to discuss individual access needs. Mr. Stueck's access from Oak Street will be maintained if alternate access is not available. Mr. Beard stated that the owners of all utilities along Oak Street are aware of the proposed project and relocation of utilities appears to be feasible. The Department of Highways Right-of-Way Bureau maintains a Utilities Section to coordinate required utility relocations.

Ken Rapp, MDOH District Engineer from Butte, was called upon to briefly discuss the status of an additional I-90 interchange for Bozeman. Mr. Rapp stated that the Department of Highways has selected five additional locations for interchanges in Montana from a number of locations nominated by local governments or private groups. The Bozeman Policy Coordinating Committee submitted a nomination, on behalf of the City and County, for an I-90 interchange in the North 19th Avenue - Springhill Road area; however, the site was not one of the initial five locations identified by MDOH. Mr. Rapp further stated that additional interchange construction is likely only after construction and rehabilitation of the interstate system is completed. Assuming that federal funding remains at its current level, interchange construction at one of the five identified locations is anticipated to begin no sooner than 1989.

Comment: Ralph Olson, land owner at 1905 Willow Way. Mr. Olson submitted a written petition supporting the "no-build" option for Kagy Boulevard in the Willow Way area. The group he represents feels that other locations for the roadway would have fewer impacts on local residents.

Response: Mr. Bartsch noted for the record that a petition from Willow Way and Alder Court property owners supporting the "no-build" alternative for Kagy Boulevard had been submitted.

Comment: Noel Joyce, owner of the Thrifty Scot Motel north of the proposed Oak Street alignment. Mr. Joyce requested information on how close the new roadway would be to the motel building and whether additional right-of-way would be required from the motel property. He also asked if assessments against adjacent property owners would be required to fund private construction of Oak Street.

Response: Mr. Beard stated that a preliminary layout of the preferred alternative for Oak Street was available for review by Mr. Joyce after the meeting. The proposed right-of-way for Oak Street will not require any additional right-of-way from the motel property. A portion of the motel building is situated approximately 25 feet from the existing right-of-way limits. When the ultimate facility on Oak Street is constructed, the nearest travel lane will be more than 40 feet from the motel building. One of the owners of the property north of Oak Street stated that the interim roadway would be financed solely by the developers.

Comment: Dave Ayers, land owner at 1921 Willow Way. Mr. Ayers expressed his support for the North 19th Avenue - Oak Street project as the PCC/TAC first priority for FAU funds. He also requested information regarding the difference between the proposed centerline elevation of Kagy Boulevard and abutting properties.

Response: Mr. Bartsch noted Mr. Ayers' support of the North 19th Avenue - Oak Street project for the record. Mr. Beard stated that the centerline elevations of the proposed roadway on Kagy Boulevard was unknown at this time since design work on the project has not been initiated. Mr. Beard indicated that the amount of earthwork (excavation and embankment requirements) will play an important role in

determining the final centerline elevations of the roadway. Existing site improvements on adjacent properties (driveways and sidewalks) will be matched as much as possible by new construction.

Comment: Bob Paugh, home owner at 2444 Valley Center East. Mr. Paugh stated he believed that Oak Street should be kept to a minimum two-lane roadway and that priority should be given to developing North 19th Avenue to Baxter Lane and ultimately to an interchange at I-90. He pointed out that another important link (Valley Center Drive) will be constructed in the future and will increase the need for traffic facilities on North 19th Avenue.

Response: Mr. Bartsch acknowledged Mr. Paugh's comments regarding local priorities for the record.

Comment: Roger Smith, owner/developer of the Annie Subdivision west of North 19th Avenue. Mr. Smith expressed his support for the North 19th Avenue - Oak Street projects at TAC/PCC's number one priority for FAU funding. He also offered comments regarding right-of-way dedications along North 19th Avenue.

Response: Mr. Bartsch acknowledged Mr. Smith's support of the North 19th Avenue - Oak Street project and his clarification of the current right-of-way situation on North 19th Avenue.

Comment: Helen Arts, property owner at 907 North 17th Avenue. Mrs. Arts expressed concern that the rear half of her property (which could be divided and sold) would not have access from North 19th Avenue.

Response: Joe Micheletti discussed Mrs. Arts' access situation and indicated that field right-of-way agents would be in contact with her prior to project construction. Mr. Micheletti also suggested that a joint use access with an adjacent property owner (Martin Plumb) in a similar situation may be a suitable means of satisfying the access requirements of both land owners.

Comment: Dorothy Eck, State Senator from Bozeman. Mrs. Eck asked what the total project cost savings for North 19th Avenue - Oak Street would be if developers construct initial roadway facilities prior to the completion of the project.

Response: Mr. Beard stated that no estimate of project savings resulting from privately-installed roadways on North 19th Avenue - Oak Street was available at this time since very little was known about the type of roadway (pavement design, drainage facilities, etc.) that may be constructed. Mr. Beard further stated that the road design by the Department of Highways will incorporate as much of the interim roadway section as possible into the development of the ultimate facilities on North 19th Avenue and Oak Street. Project cost savings are dependent upon the amount of interim usage of North 19th Avenue and Oak Street and the condition of the facilities at the time that construction of the ultimate facility is initiated. If the interim facilities are heavily used and deteriorated by the time the construction of the ultimate roadways begin, the salvage value of the interim facility may be limited. Additionally, the type of interim roadway that is constructed will affect its salvageability. A roadway with a crowned section (one which drains both ways from the roadway centerline) would be less salvageable than one that was cross-drained (drains in one direction only) toward the future shoulder and curb and gutter. Interim roadway construction will result in some project cost savings.

After these oral comments were received, the hearing was closed. Informal discussions regarding the projects were held after the meeting between representatives of the

Department of Highways, the Consultant, and the public. The proceedings of the meeting were tape recorded and substantive comments have been incorporated into the Final EIS.

E. Agency Comments and Responses

The following section includes comments on the Draft EIS as submitted during the initial review period by federal, state and local government agencies. Agency comments were reviewed and responses to individual comments were drafted when appropriate. Comments generally suggested corrections to text and technical data and requested additional discussion of specific EIS subject matter. Practical and reasonable criticism was incorporated in the Final EIS in an effort to improve the overall quality of the documents. Modifications to the Final EIS are identified in the responses that accompany agency letters.

When comments were not directed at specific points of the EIS or reflected on the author's viewpoint, lengthy responses were considered unnecessary. These comments have been acknowledged through the following self-explanatory responses:

A "No response required" response is given to comments which are statements that raise no specific questions regarding EIS subject matter.

A "Your comments have been noted" response is given to comments that are considered substantive but require no specific response.

A "Your opinion has been noted" response is given to comments that are considered to be unsupported statements of opinion.

F. Written Public Comments and Responses

Nine written public comments were received on the Draft EIS prior to May 5, 1986. These comments were generally written to express an opinion regarding the content of the Draft EIS. The following section includes all of the written public comments received on the Draft EIS and, where necessary, responses to individual comments. Practical and reasonable criticism was incorporated into the Final EIS in an effort to improve the overall quality of the document. Modifications to the Final EIS are identified in the responses that accompany each letter. A response format similar to that used for the agency comments accompanies each letter.

Comment

DEPARTMENT OF THE ARMY
OMAHA DISTRICT, CORPS OF ENGINEERS
6014 U.S. POST OFFICE AND COURTHOUSE
OMAHA, NEBRASKA 68102-4978

REPLY TO ATTENTION OF

March 21, 1986

Planning Division

Mr. Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59620

Dear Mr. Kologi:

We have reviewed the Draft EIS for the Kagy Boulevard Project, M 1212(4), and the 19th and Oak Street Project, M 1299(1). Our comments on Permits and Cultural Resources are attached.

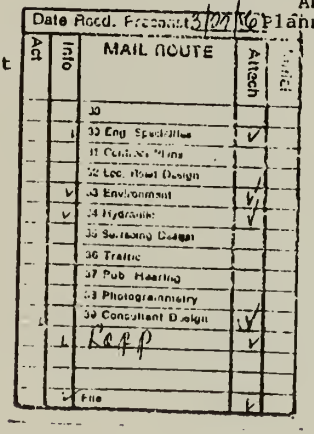
If you have any questions on these, please contact Steve Rothe of our offices at (402) 221-4579. Thank you for this review opportunity.

Sincerely,

Richard D. Gorton

Richard D. Gorton
Chief, Environmental
Analysis Branch
Planning Division

Attachment



Response

RESPONSE TO COMMENTS BY:

Richard D. Gorton
Chief, Environmental Analysis Branch
Planning Division
Omaha District Corps of Engineers
Department of the Army
Omaha, NE

Comment

CORPS OF ENGINEERS COMMENTS
Kagy Boulevard Project, M 1212(4)
19th and Oak Street Project, M 1299(1)

PERMITS

Both projects, North 19th Avenue and Oak Street M 1299(1) and Kagy Boulevard M 1212(4), cross waterways which would be considered waters of the United States for regulatory purposes. The Draft Environmental Impact/4(f) Statement indicates that these waterways do not carry an average annual flow of 5 cfs. While the proposed crossings may fall under the provisions of one of the Nationwide Permits contained in 33 CRF Part 330, it is recommended that final project plans be submitted to the following address for final Corps of Engineers permit determination: 1

Mr. Robert McInerney
U.S. Army Corps of Engineers
c/o DNRC/CDD
1520 East 6th Avenue
Helena, MT 59620

CULTURAL RESOURCES

The cultural resources work is complete for this phase of the compliance. Further discussion appears to be necessary regarding the "eligibility" or "non-eligibility" of the Smith farmhouse for the National Register of Historic Places. 2

Response

1. Carl Peil, Manager MDOH Hydraulics Unit, contacted the Consultant on September 29, 1986, regarding this comment. Mr. Peil indicated that the stream crossings would, in all likelihood, fall under the provisions of a Nationwide Permit since they lie above a recognized "headwaters" area. He further stated that design plans for the proposed crossings could be transmitted to the Corps of Engineers representative in Helena for review and project files.

2. Your comment has been noted. Further consultation with the State Historical Preservation Office was initiated following the selection of a preferred alternative for North 19th Avenue. The results of this consultation are summarized in the final Section 4(f) Evaluation contained in this document.

Comment

United States Department of Agriculture
Soil Conservation Service
Federal Building, Room 443
10 East Babcock Street
Bozeman, MT 59715

April 7, 1986

Mr. Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59620

RE: Draft EIS--Bozeman Arterials, FHWA-MT-EIS-86-01-D

Dear Mr. Kologi:

We offer the following comments for the above EIS pertaining to Part III: Affected Environment, Geology and Soils, paragraph d. Prime and Unique Agricultural Lands on page 39.

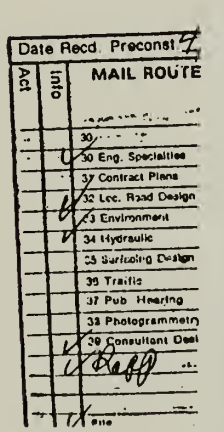
> Paragraph should read: Consultation with the United States Department of Agriculture, Soil Conservation Service in Bozeman indicated that prime or unique agricultural lands have not been designated at this time due to the lack of a soil survey within the project study area. 1
>
> The remaining portion of the paragraph is satisfactory.

We appreciate the opportunity to comment on this draft impact statement.

Sincerely,

Glen H. Loomis
State Conservationist

cc: Ron Batchelor, State Biologist, SCS, Bozeman, MT



Response

RESPONSE TO COMMENTS BY:

Glen H. Loomis
State Conservationist
Soil Conservation Service
Bozeman, MT 59715

1. The text in "Part III: Affected Environment, Geology and Soils, paragraph d. Prime and Unique Agricultural Lands" on page 39 of the Draft EIS has been modified as per SCS comments.

Comment

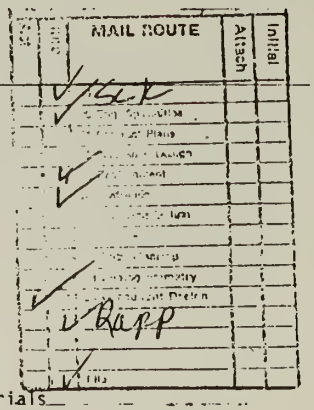
United States Environmental Protection Agency
Region 8, Montana Office
Federal Building
301 S. Park, Drawer 10096
Helena, Montana 59626-0096

EPA

REF: 8MO

May 7, 1986

Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, Montana 59620



Re: Draft EIS
Bozeman Arterials

Dear Mr. Kologi:

In accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act, the Region VIII Montana Office of the Environmental Protection Agency (EPA), has reviewed the referenced documents and agrees with your conclusion that environmental improvements associated with this project far outweigh any negative impacts. Improved traffic flow and reduced use of unsurfaced streets will result in better air quality. 1

While the need for stormwater detention facilities is discussed and reference is made to the "Stormwater Master Plan", it is not clear if any portion of these facilities is to be constructed under this project. If detention facilities identified in the master plan are not scheduled for construction prior to or concurrent with this project, there should be provisions to install facilities to treat stormwater collected from the new roadway. 2

There will be a meeting on May 14 of representatives from a number of State and Federal agencies concerned with activities impacting wetlands. Further EPA comments regarding mitigation or equivalent replacement of the one-quarter (1/4) acre of wetland affected by this project may be appropriate following the meeting. 3

The EPA rating of this DEIS is EC-1 (Environmental Concerns, Statement Adequate).

Thank you for providing this opportunity for our review and comment on the DEIS. If you have any questions regarding the above comments, please call me at 449-5432.

Sincerely,

John F. Wardell, Director
Montana Office

cc: Dale Vodehnal, 8PM-EA

Response

RESPONSE TO COMMENTS BY:

John F. Wardell, Director
Montana Office
U.S. Environmental Protection Agency
Helena, MT

1. Your comments are noted.

2. Due to the fiscal scheduling of these projects, it is very likely that the storm water detention facilities identified in the Bozeman Stormwater Master Plan will be in place by the time that the preferred alternatives are constructed. However, if the project timing is such that roadway construction precedes the installation of the detention facilities, interim detention facilities must be included as a part of the final facility design. As indicated by the text on page 137, a cooperative project between MDOH and the City of Bozeman could be considered to construct the interim storm drainage facilities. Any interim detention facilities could be incorporated into the design of the ultimate planned facilities. It should be noted that privately funded interim road construction is likely on North 19th Avenue and Oak Street within the next two years. These interim roadways will be paved and roadside ditches will be used to provide attenuation of pollutants and temporary detention of storm water. In the absence of a centralized collection system, detention facilities would not be necessary with interim roadway improvements.

3. Your comments are noted.

Comment

U.S. Department of Housing and Urban Development
Denver Regional Office, Region VIII
Executive Tower
1405 Curtis Street
Denver, Colorado 80202-2349

March 24, 1986

Mr. Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, Montana 59620

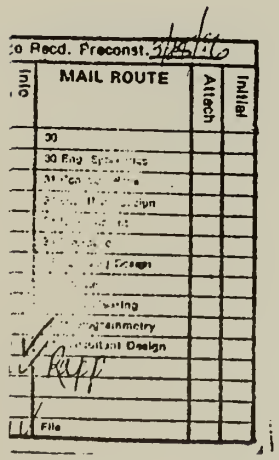
Dear Mr. Kologi:

This is in response to your request for comments on the Draft Environmental Impact Statement (DEIS) for the Kagy Boulevard project M1212(4), and the 19th and Oak Street project, M1299(1), dated February 1986. Your DEIS has been reviewed with consideration for the areas of responsibility assigned to the Department of Housing and Urban Development. This review considered the proposal's compatibility with local comprehensive planning and impacts on urbanized areas. Within these parameters, we find this document adequate for our purpose. 1

If we may be of further assistance, please contact Mr. Howard S. Kutzer, Regional Environmental Officer, at (303) 844-3102.

Sincerely,

for Robert J. Matuschek
Director
Office of Community
Planning and Development



Response

RESPONSE TO COMMENTS BY:

Charles A. Freeman for
Robert J. Matuschek, Director
Office of Community Planning
and Development
Denver Regional Office, Region VIII
U.S. Department of Housing
and Urban Development
Denver, CO

1. No response required.

Comment

IN REPLY REFER TO:
1797 (930)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
222 North 32nd Street
P.O. Box 36800
Billings, Montana 59107

March 13, 1986

Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, Montana 59620

Dear Mr. Kologi:

We have no comments on the Draft Environmental Impact Statement (DEIS) for the Kagy Boulevard project, M 1212(4), and the 19th and Oak Street project, M 1299(1), in Bozeman, Montana.

No Bureau of Land Management lands or resources are involved in either project. 1

Thank you for the opportunity to review the document and provide comment.

Sincerely,

for John A. Kwiatkowski
Deputy State Director, Division
of Lands and Renewable Resources

Date Read. Preconst. 3-18-86

Act	Info	MAIL ROUTE	Attach	Initial
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		30 Eng. Specialties		
		31 Contract Plans		
		32 Loc. Road Design		
		33 Environment		
		34 Hydraulic		
		35 Surfacing Design		
		36 Traffic		
		37 Pub. Hearing		
		38 Photogrammetry		
✓		39 Consultant Design		

Response

RESPONSE TO COMMENTS BY:

John A. Kwiatkowski
Deputy State Director
Division of Lands and Renewable Resources
Bureau of Land Management
Billings, MT

1. No response required.

Comment

United States Department of the Interior
BUREAU OF RECLAMATION
Missouri Basin Region
P.O. Box 36900
Billings, Montana 59107-6900

IN REPLY
REFER TO: MB-150

MAR 6 1986

MT 1299(1)
1212(4)
Bozeman

Mr. Stephen C. Kologi
Chief, Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59620

Dear Mr. Kologi:

We have reviewed the Draft Environmental Impact 4(f) Statement FHWA-MT-EIS-86-01-D and find the proposed highway work will have no effect on Bureau of Reclamation projects. 1

Sincerely yours,

Dean D. Loomis

Dean D. Loomia
Acting Regional Environmental Affairs Officer

Date Recd. Preconst: 2/14/86

Act	Info	MAIL ROUTE	Attach	Initial
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		30 Eng. Specialties		
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		32 Loc. Road Design		
		33 Environment		
		34 Hydraulic		
		35 Surfacing Design		
		36 Traffic		
		37 Pub. Hearing		
		38 Photogrammetry		
		39 Consultant Design		
		File		

Response

RESPONSE TO COMMENTS BY:

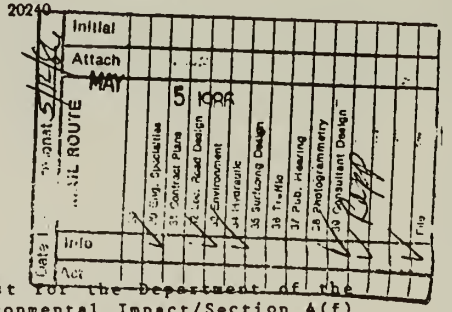
Dean D. Loomis
Acting Regional Environmental
Affairs Officer
Missouri Basin Region
Bureau of Reclamation
Billings, MT

1. No response required.

Comment

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240



ER 86/389

Mr. V. K. Jensen
Division Administrator
Federal Highway Administration
301 S. Park, Mail Drawer 10056
Helena, Montana 59601

Dear Mr. Jensen:

This is in response to the request for the Department of the Interior to review the draft Environmental Impact/Section 4(f) Statement for the Kagy Boulevard Project and the 19th and Oak Street Project, Bozeman, Gallatin County, Montana.

SECTION 4(f) STATEMENT COMMENTS

We concur that there are no feasible and prudent alternatives to the use of the Smith farmlands property for the proposed projects. We also believe that all measures for mitigating adverse impacts to 4(f) lands have been incorporated in the project plans. 1

ENVIRONMENTAL STATEMENT COMMENTS

The Fish and Wildlife Service advises that if the erosion control practices that are listed on page 111 are followed during construction, there should be no significant impacts to the stream located within the project area. 2

SUMMARY COMMENTS

The Department of the Interior has no objection to Section 4(f) approval for this project. The opportunity to review this document is greatly appreciated. 3

Sincerely,

Terence N. Martini
for Bruce Blanchard, Director
Environmental Project Review

Mr. Stephen C. Kologi
Chief, Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue

Response

RESPONSE TO COMMENTS BY:

Terence N. Martini for
Bruce Blanchard, Director
Environmental Project Review
U.S. Department of the Interior
Office of the Secretary
Washington, D.C.

1. No response required.

2. Your comments are noted. The erosion control practices are part of the Montana Highway Department's Standard Specifications for Road and Bridge Construction and will be in effect during the construction of these projects.

3. No response required.

Comment

U.S. Department of Transportation
Office of the Secretary of Transportation

Rodrigo

Memorandum

Subject: Draft Environmental Impact/Sec. 4(f) Statement
MONTANA - Gallatin County
Bozeman Arterials and Kagy Boulevard
FHWA-MT-EIS-86-01-D

Date: APR 2 1986

From: Eugene L. Lehr, Chief
Environmental Division

Reply to Attn of:

To: Eugene W. Cleckley, Chief
Environmental Operations
Division, HEV-11

We appreciate the opportunity to review this DEIS. We have no comments. 1

Response

RESPONSE TO COMMENTS BY:

Eugene L. Lehr, Chief
Environmental Division
Office of the Secretary of Transportation
Washington, D.C.

1. Your comments have been noted.

Comment

DEPARTMENT OF COMMERCE
AERONAUTICS DIVISION

TED SCHWINDEN, GOVERNOR

P.O. BOX 5178
2630 AIRPORT ROAD

STATE OF MONTANA

(406) 444-2506

HELENA, MONTANA 59604

April 14, 1986

Mr. Stephen C. Kologi, P.E.
Chief, Preconstruction Bureau
State of Montana
Department of Highways
2701 Prospect Avenue
Helena, MT 59620

FILE: M 1299 (1)
No. 19th Ave. & Oak St.
M 1212 (4)
Kagy Blvd. from 3rd. to 19th

Dear Mr. Kologi:

The Montana Aeronautics Division has reviewed the above-mentioned project, and in our opinion this project will not have any adverse effects on aeronautical activities in this area. 1

Thank you for the opportunity to comment on this project.

Sincerely,

Michael D. Ferguson, Administrator
Aeronautics Division

Vern Moody

Vern Moody
Aviation Representative

bp

AN EQUAL OPPORTUNITY EMPLOYER

Date Recd. Preconst. 4/15/86

Act	Init	MAIL ROUTE	Attach	Initial
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		30 Eng. Specialties		
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		35 Surfacing Design		
		36 Traffic		
		37 Pub. Hearing		
		38 Signing Symmetry		
		39 Consistent Design		

Response

RESPONSE TO COMMENTS BY:

Vern Moody
Aviation Representative
Aeronautics Division
Montana Department of Commerce
Helena, MT

1. No response required.

Comment

DEPARTMENT OF COMMERCE
TRANSPORTATION DIVISION

TED SCHWINDEN, GOVERNOR
1424 9TH AVENUE

STATE OF MONTANA

(406) 444 3423
HELENA, MONTANA 59620-0401

File: 1-18-18

March 21, 1986

Mr. Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, Montana 59620

Dear Steve:

RE: BOZEMAN ARTERIALS - NORTH 19TH AVENUE - OAK STREET
M1299(1) - KAGY BOULEVARD M1212(4) - DRAFT ENVIRONMENTAL IMPACT/4(f) STATEMENT

In review of the subject document, the Milwaukee properties, which would be affected by the Kagy Boulevard M1212(4) project, are still tied up in court with a class action suit. 1
It would be advisable to check the status of this court suit. There currently is not planned any future railroad use of the Milwaukee properties which our Division is aware of.

If we can be of any further assistance, please contact me.

Yours truly,

Richard A. Howell

Richard A. Howell, Manager
Special Projects
Transportation Division
(406) 444-3676

RAH/sc

Date Recd. Preconst. 3/24/86

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V		Kagy		
	V	File		

AN EQUAL OPPORTUNITY EMPLOYER

Response

RESPONSE TO COMMENTS BY:

Richard A. Howell, Manager
Special Projects
Transportation Division
Montana Department of Commerce
Helena, MT

1. The City of Bozeman plans to acquire the former CMSTP&P railroad right-of-way north of Kagy Boulevard and develop it as a linear parkway (Bozeman Chronicle, "City to Hear Update on Linear Parkway" July 15, 1985). The pedestrian provisions included in the design of the preferred alternative for Kagy Boulevard will be consistent with the eventual development of this pedestrian-oriented facility.

Comment

DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
AIR QUALITY BUREAU

TED SCHWINDEN, GOVERNOR — COGSWELL BUILDING

STATE OF MONTANA

(406) 444-3454 — HELENA, MONTANA 59620

March 31, 1986

Mr. Stephen Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
Capitol Station
Helena, MT 59620

Dear Mr. Kologi:

This is in response to your draft Environmental Impact Statement regarding the Bozeman Arterials, North 19th Avenue - Oak Street M1299(1), and Kagy Boulevard M1212(4).

In general, any project which will smooth out the traffic flow, and reduce stopping and idling time will also reduce the amount of air pollution emissions from transportation sources. From this standpoint the Air Quality Bureau would like to support your efforts to upgrade the Montana highway system. Asphalt plants and gravel crushers are the primary emission sources for highway construction, and they must obtain an air quality permit from our office to operate in the state. 1

Sincerely,

Warren Norton
Environmental Specialist

WN:sj

cc: Emery Nelson, Gallatin Co. R.S.

Date Recd. Preconst. 4/3/86

Act	Info	MAIL ROUTE	Attach
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AN EQUAL OPPORTUNITY EMPLOYER

Response

RESPONSE TO COMMENTS BY:

Warren Norton
Environmental Specialist
Air Quality Bureau
Montana Department of Health and Environmental Sciences
Helena, MT

1. Your comments have been noted.

Comment

Montana Department of Fish, Wildlife & Parks

Helena, Montana 59620
March 13, 1986

Mr. Stephen C. Kologi, P.E.
Chief, Preconstruction Bureau
Department of Highways
2701 Prospect
Helena, Montana 59620

RE: M1299(1) North 19th Avenue-Oak Street
M1212(4) Kagy Boulevard

Dear Mr. Kologi:

We have reviewed the draft Environmental Impact Statement for the above projects. The Department of Fish, Wildlife and Parks has no further comments to make. 1

Sincerely,

Gretchen Olheiser

GRETCHEN OLHEISER, Chief
Project and Planning Bureau
Parks Division

SD/lj

Date Recd. Preconst. 3-20-86

Act	Info	MAIL ROUTE	Attach	Initial
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		36 Traffic		
		37 Pub. Hearing		
		38 Photogrammetry		
		39 Consultant Design		
✓	✓	K. H. Kapp		
✓		File		

Response

RESPONSE TO COMMENTS BY:

Gretchen Olheiser, Chief
Project and Planning Bureau
Parks Division
Montana Department of Fish,
Wildlife & Parks
Helena, MT

1. No response required.

Comment

1220 D North Eighth
Bozeman, Montana

March 14, 1986

Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, Montana

Gentlemen,

This letter's purpose is to inform you of a problem we have involving the construction of Oak Street. Our home address is on Eighth street with the rear of our house on the proposed Oak Street. Our garage faces east on Oak Street. With the proposal of Oak to be non-accessable this will land lock my property with no way to use our garage. As it is we will be required to remodel the garage turning it to face North West even to be able to use it. 1

When the final plans are established for Oak Street we intend to try to resolve this problem with the local board, but I haven't really researched what my options are at this point. Our home was built in the 50's and we have owned it for 10 years. Without the use of Oak Street to enter our property we will be isolated because of the shape of the property.

Please advise me of any future decisions concerning Oak Street.

Yours very truly,

Don E Stueck

Don E. Stueck

Date Recd. Preconst 3-18-86

Act	Info	MAIL ROUTE	Attach	Initial
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		34 Hydraulic		
		35 Surfacing Design		
		36 Traffic		
		37 Pub Hearing		
		38 Photogrammetry		
		39 Consultant Design		

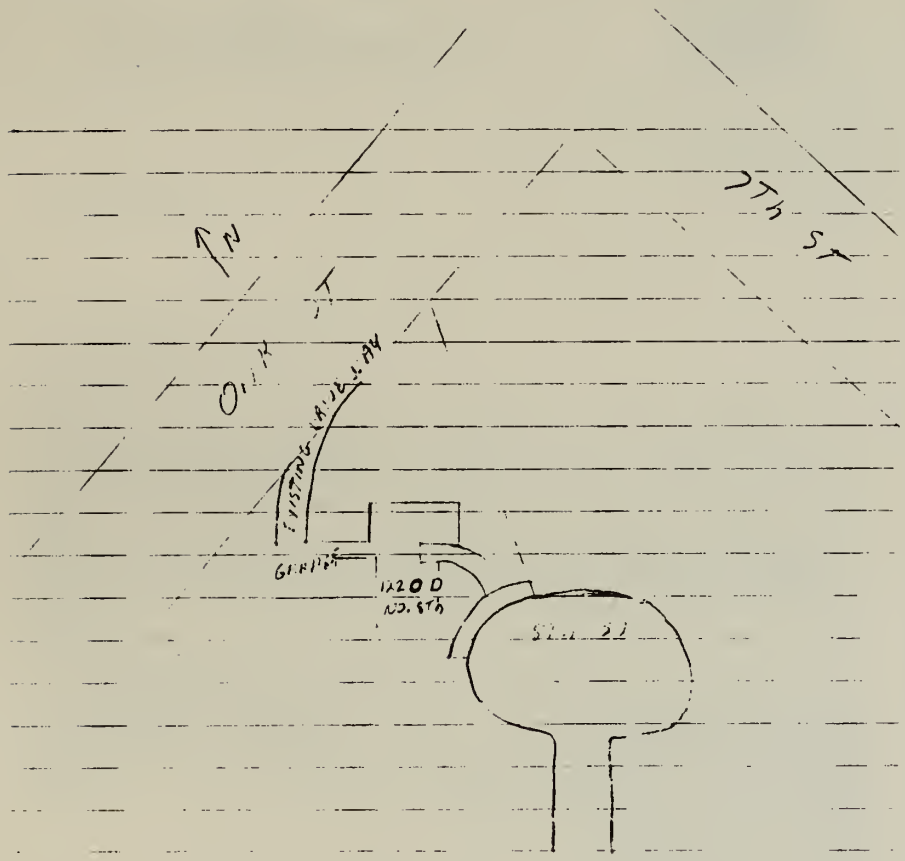
Response

RESPONSE TO COMMENTS BY:

Don E. Stueck
1220 D North Eighth
Bozeman, MT

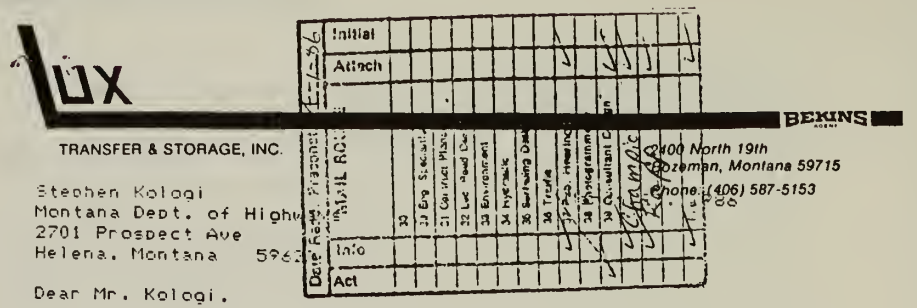
1. The Bozeman Policy Coordinating Committee formally recommended that North 19th Avenue, Oak Street, and Kagy Boulevard be developed as "limited access facilities". This design does not mean that the roadway will be non-accessible to adjacent property owners. The Montana Department of Highways, in conjunction with the City of Bozeman and Gallatin County, will develop an access control plan for the roadway corridors. The intent of this plan will be to limit access to those locations identified as necessary for future roads and streets and to maintain access to private properties abutting the project. The Department of Highways will negotiate with individual landowners to acquire access rights to undeveloped properties or to limit access to existing locations. Access will be provided from the arterial street if it comprises the only access to the property. Landowners will be justly compensated for any access changes required by the project.

Comment



Response

Comment



LUX
TRANSFER & STORAGE, INC.
BEKINS
2400 North 19th
Bozeman, Montana 59715
Phone: (406) 587-5153

Initial
Attach
Info
Act

Stephen Kologi
Montana Dept. of Highw
2701 Prospect Ave
Helena, Montana 596

Dear Mr. Kologi,

I have a few thoughts in response to the enclosed letter that I found in my mailbox, that speaks to the proposals in the Draft Environmental Impact Statement.

Having been involved with a transportation business for the last 13 years has taken me on nearly every major highway and a lot of lesser roadways in this country. Certainly that effects my viewpoints on the statement and on this letter. The number one problem, in my mind, with the road systems in the Bozeman area (next to lack of financial resources) is the lack of through streets. The only street that does not dead end presently is Main. There is a substantial cost to this inhibited traffic flow and that cost is passed on to the consumer. Because nothing reaches the consumers hands that has not been on at least one truck, this problem effects everyone. 1

It would seem that since the transportation industry finances road projects so heavily, (page 21 of the Draft Environmental Impact) and because of their importance to the consumer and the business world, more thought would be given to making their navigation easier, not more difficult. 2

I would recommend running Kagy as straight as is feasible. Everything that could have been done wrong with Kagy occurred. It is plagued by dangerous curves, bad intersections, and is a dead-end at both ends. We need to build arterials that will move traffic at 35 to 40 miles per hour and construct intersections that will allow a truck to negotiate the corner. I, too live on Willow Way and appreciate our quality of life, however, there is a price for progress and a price for getting our traffic flow into good working order. 3

I also have a concern with the Oak Street proposal. Instead of correcting the problem of congestion that now effects Durston and North 7th, this proposal simply moves it 7 blocks away. It will still require a left turn against opposing traffic. What is needed are connections with I-90 and U.S. 10. My staff has done some work with the local Technical Advisory Committee in an attempt to get state help on building an interchange that would extend North 19th to I-90. 4 5

Thank you for letting me voice my concerns and for your attention to this matter.

Sincerely,

Thomas Reiner

Thomas Reiner

Response

RESPONSE TO COMMENTS BY:

Thomas Reiner
Lux Transfer & Storage, Inc.
2400 North 19th
Bozeman, MT

1. Your comments have been noted.

2. Your comments have been noted.

3. The proposed Kagy Boulevard project corridor has been identified as a desirable route for an arterial roadway since transportation planning was formally initiated for the City in 1958. The proposed roadway will facilitate the movement of traffic in a safe and efficient manner.

4. One of the primary benefits provided by the installation of traffic facilities on North 19th Avenue and Oak Street will be traffic relief on Durston Road and North Seventh Avenue. An examination of the projected design year traffic volumes contained in the Draft EIS (Figure 9, "Projected Design Year Traffic With and Without Projects") clearly indicates the effects that the proposed projects will have on North Seventh Avenue and Durston Road. The figure shows that design year traffic on North Seventh Avenue, between I-90 and Main Street, will be reduced by some 12,000-14,000 vehicles per day if the projects are constructed. Similarly, design year traffic on Durston Road is expected to be reduced by 5,000 vehicles per day if the projects are installed.

   The left turn movements to and from North Seventh Avenue at the intersection of Oak Street and North Seventh Avenue will be regulated by traffic signals. It is anticipated that the signal phasing would provide for protected left turn movements thereby eliminating the traffic conflicts often caused by left turning vehicles.

5. Your comments have been noted.

Comment

March 1986

Stephen C. Kologi
Chief, Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, Montana 59620

Dear Mr. Kologi,

We, the undersigned, believe there are at least two options which are better than the one proposed in the Draft Environmental Impact 4(f) Statement. Both will permit attainment of the principal objective, i.e. extension of Kagy to 19th. Yet both will decrease the adverse effects upon the majority of us who are directly affected by the proposed arterial. In order of preferance, they are:

1. Extend the present western end of Kagy (at 11th) in a southwesterly direction (either east or west of the radio station) until it can be reasonably run due west to 19th. It could be put in line with Stucky, for example. Advantages of this option over the proposed option include:

a. The Wright House would not have to be demolished.

b. Those of us who live on Willow Way came out here in order to get away from traffic, noise, pollution, etc. Now our planners are proposing that these be introduced 24 hours a day just a few feet from where we live. If the planning had been done 30 years ago and we had been informed, we could have located elsewhere. Our aggravation can be lessened by constructing the arterial farther away from us.

c. Extending Kagy into Willow Way would decrease value of houses along Willow Way and greatly reduce the numbers of prospective buyers of the houses. No one in his right mind would try to raise children in a house located 35 feet from an arterial highway.

d. Trees in this area are a highly valued asset. A reasonably sized evergreen takes at least 30 years to grow. The proposed extension of Kagy would destroy many of the trees along Willow Way and most, if not all, of those around Wright's. If the north-south part of Willow Way were moved to make it run straight south, in accordance with the proposal, apparently all of the trees at Wright's would be destroyed. This grove of trees serves as a habitat for birds and other wildlife.

e. The problems of access to the arterial, e.g. from residences along Willow Way and from the North-South part of Willow Way could be avoided. Parking problems would be insurmountable along the arterial.

We realize that there is an advantage in having roads run straight. Since Kagy already fails to meet this criterion, it doesn't appear to be a significant argument in favor of the proposed route.

The major disadvantage of our option is that of extending Kagy through farmland. Objectionable as this probably is to those affected, it nevertheless is (a) inevitable sooner or later anyway (many houses have already been built south of this area (b) much less objectionable than extending the road through our front yards and (c) probably a financial advantage to those directly affected because of businesses locating along the road and because of subdivisions which would surely follow shortly thereafter.

Option 2. Leave the right-of-way boundaries on the north side of Willow Way in their present location and extend the right-of-way along the south side of Willow Way far enough south to accomodate the highway. Under this option, the north-south end of Willow Way would be made into a dead-end street (planners apparently want minimal access to the arterial highway anyway). A suitable fence or other barrier would be constructed between Wright's house and the highway and between Boylan's house and the highway; if Wrights and Boylans would prefer, their houses could be moved farther away from the highway.

Advantages of this option over the proposed option include:

a. The Wright House would not have to be demolished.

b. We think it would be less costly to taxpayers. Farmland at least ought to cost less than residential land and there would be no house to demolish and replace elsewhere.

c. The only trees that would have to be destroyed would be the few near the road on Boylan's property.

d. All of us along the north side of Willow Way would benefit by having the highway farther from our houses.

e. All of the residents along the north-south part of Willow Way would benefit from having this street turned into a dead-end street. The proposed option (Dept of Highways) would turn this street into a heavily travelled street (the University is planning to close 11th to motorized vehicles).

f. The proposed option would locate the highway close to all of our houses. Our option 2 would keep the highway a more reasonable distance from most of our houses and, if Wright's and Boylan's houses were moved, it would locate the highway a more reasonable distance from all of our houses.

Respectfully submitted,

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
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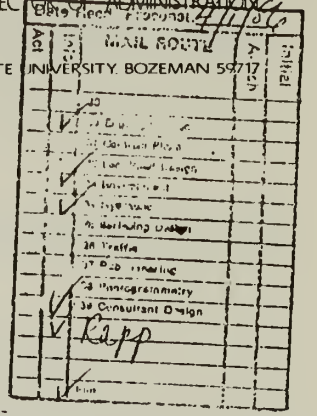
Comment

MSU

OFFICE OF THE DIRECTOR OF ADMINISTRATION

MONTANA STATE UNIVERSITY BOZEMAN 59717



March 27, 1986

Mr. Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59620

RE: DEIS Review Comments
Kagy Boulevard M 1212(4)
Bozeman, MT 59715

Dear Mr. Kologi:

Thank you for including MSU in your circulation list. Our staff have reviewed the above-referenced document and offer you the following two observations:

1. We have a strong concern for protecting our utility lines that cross Kagy. During the last Kagy improvement project (1984) our telephone and computer communication cables were severed by the contractor and MSU was never reimbursed for the extensive costs of reinstalling these. I hope that any future project will not cause us any similar difficulties. 1

Response

RESPONSE TO COMMENTS BY:

Craig Roloff
Acting Director of Administrative Services
Office of the Director of Administration
Montana State University
Bozeman, MT

1. The contractor's responsibillties relative to utility services are clearly stated in Article 07.19 of Standard Specifications for Road and Bridge Construction which has been adopted by the Montana Department of Highways and the Montana Highway Commission. The following excerpts specify the contractor's responsibllities for underground utilities.

> 07.19 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES. At points where the contractor's operations are adjacent to utility or other property, work shall not be commenced until all arrangements necessary for the protection of that property have been made in order to prevent damage resulting in considerable expense, loss, or inconvenience. The contractor shall contact the owners of service or other facillties or adjacent property to determine what measures, if any should be adopted to assure adequate protection of the facilities and to protect persons and property from any damage that might result. The contractor shall learn the locations of such facilities and properties and mark and distinguish them. Extreme care shall be taken in excavating and backfilling adjacent to underground service lines or other types of underground facilities. . .
>
> . . . The contractor shall be responsible for and shall take all necessary precautions to protect and preserve any and all existing tile drains, sewers, or other subsurface drains, conduits, and other underground structures or parts thereof that may be affected by the operations In the contract and that, in the opinion of the engineer, may be properly continued in use without any change. . .
>
> . . . In the event of interruption to water or utility services as a result of accidental breakage or as a result of being exposed or unsupported, the contractor shall promptly notify the property authority and shall cooperate with the authority in the restoration of service. . .
>
> . . . The contractor shall satisfactorily repair at no cost to the Department all damage to such facllities or structures that may result from his operations or from his negligence during

Comment

2. The second item is more environmental, dealing with what is referred to on page 41, figure 4, as an intermittent drainage. Approximately 1/4 mile north of the proposed Kagy Boulevard development, the intermittent drainage flows into a stream that is not intermittent. The stream has an observed quality normally associated with a spring creek. The stream flows through Montana State University lands and except for periods of heavy run-off, the stream is clear and cold and is noted that watercress grows in it. In addition, the 1984 Bozeman Area Master Plan designates this as a stream corridor. Presently the proposed Kagy Boulevard development does not encompass the protection of the stream. Further assessment and study of the drainage should be made before the project is undertaken. **2**

Thank you for your consideration of these concerns.

Sincerely,

Craig Roloff
Acting Director of Administrative Services
TELEPHONE (406)994 4361

CR:el
cc: Ed Rice

Response

the period the contract is in force. The contractor and his surety shall be solely and directly responsible to the owners and operators of such properties for damage, injury, expense, loss, inconvenience, or delay or for any suits, actions, or claims of any character that may result from the carrying out of the work. . .

It is assumed that these provisions would be included in the contract for Project M1212(4), and difficulties as those experienced by MSU during the previous Kagy Boulevard improvement project can be avoided.

2. Figure 4 "Surface Water Resources" in the Draft EIS will be revised to indicate that a continuously flowing stream exists north of the proposed Kagy Boulevard alignment. The text of the EIS will also be modified to include a discussion of this small permanent stream and its water quality. The text will indicate that the Bozeman Area Master Plan identifies the drainage as a stream corridor.

The U.S. Army Corps of Engineers will be provided with a set of final plans for the Kagy Boulevard and will make a final Section 404 permit determination for the affected water courses. Other required federal and state coordination will ensure that local water quality will be maintained.

Comment

1.4

April 18, 1986

Stephen C. Kologi
Chief, Preconstruction Bureau
Montana Dept of Highways
2701 Prospect Avenue
Helena, Montana 59620

Dear Mr. Kologi,

We thank you for information recently received relative to the prooosed arterial highway construction in the Bozeman area. We appreciate the opportunity provided for input from those of us who will be adversely affected by the projects under consideration.

We recommend the selection of Alternative No. 1 (No-Build) as the best option for the proposed extension of Kagy Boulevard to 19th. Reasons for our recommendation include the following:

1. The only traffic problems in the Kagy area that might be construed as being serious are those created for a few minutes after athletic contests at Montana State University. We think it is quite likely that anyone who has time to sit for several hours and watch a ball game should also have time to sit for a few more minutes while traffic disperses. Your traffic counts support our belief that traffic congestion is not oresently serious in this area. 1

Will traffic oroblems increase within, say, the next decade? Student enrollment at Montana State University has decreased from a high of about 11,000 to about 10,000 at present and is exoected to decline further to about 9,000. As MSU goes, so goes Bozeman. We think traffic in town, and particularly in the area served by Kagy, will corresoondingly decrease. 2

Response

RESPONSE TO COMMENTS BY:

Willow Way/Alder Court Property Owners
April 14, 1986

1. The authors of the EIS agree that current traffic problems in the Kagy Boulevard area are short in duration and the result of major activities at MSU; however, the improvement of this arterial link is essential to lessen future problems and provide traffic relief on other portions of the local road system. Completion of the perimeter arterial system will ease the traffic burden on several major streets in Bozeman including North Seventh Avenue, Main Street, and Durston Road.

   Although traffic problems in the Kagy Boulevard area are not serious at the present time, computer modeling suggests that problems will arise if Kagy Boulevard is not completed. One of the most significant impacts in the Willow Way area is likely to occur on Lincoln Road. Projected design year traffic volumes on this roadway without the Kagy Boulevard project are estimated to be more than 14,000 vehicles per day. Traffic on South 11th Avenue, between Kagy and Lincoln Road, would be more than 10,000 vehicles per day without the projects. This scenario would be a severe traffic impact to MSU and Alder Court residents. The extension of Kagy will alleviate such a localized problem while addressing an important community transportation need.

2. Traffic problems in Bozeman will increase over the next decade. Even though student enrollments have declined in recent years, MDOH traffic counts at more than 100 locations within the Bozeman urban area have, for the most part, continued to indicate overall increases in traffic. Although Montana State University is a major traffic generator, it is not the sole traffic generator in Bozeman. The residential and commercial development that has occurred during the past several years on the northern, western, and southern edges of the city has been responsible for traffic increases and has elevated the need for perimeter arterial routes. Since development proposals for lands adjacent to the identified perimeter arterial system continue to be received by the City, it follows that the proposed projects will become increasingly important to the community as urbanization continues.

Comment

2. Traffic problems in the North 19th Ave.-Oak Street area are more serious than in the Kagy area. The Main Street-North Seventh-Durston areas are among the most severely impacted areas in Bozeman. These problems could be alleviated significantly by the proposed North 19th-Oak Street project. Also, unlike the Kagy area, these areas are impacted by many trucks and other commercial vehicles which need better roads. We encourage you to give this project your highest priority. 3

3. The Willow Way area is zoned for residential housing (RS-1). In fact, the east-west portion of Willow Way is owned by individual property owners. The proposed extension of Kagy would have the following detrimental impacts upon this residential area: 4

a. Traffic, noise, pollution, etc. would be markedly increased during 24 hours each day. We moved out here to AVOID these! 5

b. The value of houses and the numbers of prospective buyers of houses would be significantly decreased. No one in his right mind would want to raise children in a house located 35 feet from a highway. 6

Response

3. The transportation planning process in Bozeman has included the development of a transportation plan which identified both long- and short-range improvements to the urban street system. Based on the studies conducted for this plan, all recommended improvements were prioritized based upon the cost of each project, its traffic impacts, system-wide impacts, and potential environmental impacts. The Bozeman Policy Coordinating Committee (PCC) at the recommendation of the Technical Advisory Committee (TAC) has identified the North 19th Avenue - Oak Street project as the first priority for receiving Federal Aid Urban (FAU) funds. The improvement of Kagy Boulevard from South Third to South 19th Avenue was identified as PCC/TAC's second priority for FAU funds. To date, these priorities remain unchanged.

4. Initial examination of property ownerships in this area indicated that a continuous 60-foot-wide public right-of-way exists for the north-south portion of Willow Way and a discontinuous right-of-way of varying widths exists on the east-west portion of Willow Way. It is understood that a continuous right-of-way previously existed on the east-west portion of Willow Way; however, some portions of the right-of-way were subsequently vacated. Extensive title searches and legal investigations will be undertaken prior to initiating the right-of-way acquisition process.

5. The authors of the EIS acknowledge that increases in traffic, noise, and pollutant levels will occur in the Willow Way area due to the completion of Kagy Boulevard. Since existing roadway facilities are minimal or non-existent, these impacts will be locally significant to the residents in the Willow Way area. However, the completion of Kagy Boulevard and other major segments of the perimeter arterial system will ultimately reduce congestion and provide community-wide benefits. Computer modeling indicates that design year traffic will produce noise levels in the Willow Way area that are below the 70 dBA level identified for residences in the FHWA Noise Abatement Criteria. Improved traffic flows will reduce the amount of air pollution emissions from transportation sources in the Bozeman area.

6. Conversations with several Bozeman area realtors indicate that the previous improvement projects on North 19th Avenue and Kagy Boulevard have had little effect on the property values of lands adjacent to the projects.

The houses along Willow Way will be located approximately 35 feet from the right-of-way line, not the roadway. The installation of a five-foot-wide sidewalk, an eight-foot-wide boulevard, and a ten-foot-wide emergency parking/bicycle lane will place the nearest travel lane approximately 60 feet from the closest residential structure. Currently, this residence is 70 feet from the existing unimproved roadway.

Comment

c. Wrights' house would have to be demolished, at no small cost to taxpayers. 7

d. Many of the highly valued trees, requiring 30-40 years for replacement would be destroyed. The grove of shrubs and trees at Wrights' serves as an irreplaceable habitat for birds and other wildlife; the proposed extension of Kagy and the access from the north-south part of Willow Way would apparently entirely eliminate this grove. 8

2 of 4

e. The north-south part of Willow Way is unpaved. Increased traffic associated with the extension of Kagy would create a serious dust problem and other problems associated with traffic. 9

Response

7. Your comments have been noted.

8. The U.S. Department of the Interior, Fish and Wildlife Service in Billings was contacted regarding wildlife habitat in the Kagy Boulevard project area. It was the agency's opinion that the proposed project will not result in significant impacts to wildlife resources because of its location, land use, and human disturbance. Since the proposed right-of-way for Kagy Boulevard will require the acquisition of the Wright property, it is prudent to extend the north-south portion of Willow Way through this property to Kagy and eliminate the need for future right-of-way acquisition. The intersection can be realigned to a standard "T" configuration thereby avoiding the creation of a skewed intersection if Willow Way was connected as it currently exists.

   Right-of-way clearing would occur on the Wright property and a portion of the Graf property needed for the project. Preliminary examinations of aerial photography for the Kagy Boulevard - Willow Way area indicates that several of the large trees in the grove near the Wright property lie outside of the proposed right-of-way and may not be affected by the project. The large spruce trees on the Boylan property would need to be removed prior to the start of construction. The vegetation in the wetland area (low shrubs, willows and cattails) will be largely unaffected by the project since it is also located outside of the proposed right-of-way. The intermittent drainage that feeds this marshy area will be maintained.

9. Traffic typically follows the "path of least resistance" from its origin to its destination. The major destination in the Kagy Boulevard project area is Montana State University. Since Lincoln Road and the future Kagy Boulevard will provide direct access to the campus and university events, it is unlikely that substantial amounts of traffic would choose to detour from major paved routes onto the unpaved north-south portion of Willow Way. A detour to this roadway would produce delays for motorists traveling through the area and would be an undesirable travel route. The north-south portion of Willow Way will continue to function only as a local street through the foreseeable future.

Comment

f. Access problems from private homes onto the arterial would be serious and hazardous. Parking problems for more than a minimal number of visitors, since parking on the arterial would be forbidden, would be completely hopeless. **10**

Are you prepared to provide reasonable compensation for our losses? **11**

h. The No-Build Option would provide time to consider other routing options for the extension of Kagy to 19th. **12**

Respectfully submitted,

David M. Ayers
Helen L Ayers
Louis P Ward
Ralph A Olsen
Verona F. Olsen
Richard McKay by Mrs McKay
Christ McKay
Joseph M. Caprio
Marilyn Caprio by Mr. Caprio
Irene Hovin
Ernest Hovin
Tom Reiner
Cecelia Rezin
Kathi Lambert
Kylene Lambert
Sylvia Hodgson
Margaret A Boylan
Richard J Boylan
John C Wright
Kathy Wright
Mark Johnson
Edward A. Teppo
Anne R Teppo

ALL OF THE PEOPLE WHO HAVE SIGNED HERE LIVE ON WILLOW WAY

Response

10. The access from private homes onto Kagy Boulevard may be difficult in the design year, especially during peak hours of the day. Backing from private properties onto the arterial would be hazardous and traffic conflicts would be unavoidable. Five residences and the Church of Christ are located along the east-west portion of Willow Way and would be directly accessed from Kagy Boulevard. Current aerial photography indicates that three residences and the church already have driveways/parking areas that will allow vehicles to turn around prior to leaving the property. The other two residences have large driveways and appear to have sufficient areas available to install turnarounds. Traffic conflicts can be minimized if backing maneuvers onto Kagy Boulevard are eliminated.

    All five of the residences that are directly accessible from Kagy Boulevard have large driveway areas that can accommodate at least four vehicles. This would appear to be a sufficient amount of parking for most occasions.

11. The Montana Department of Highways is committed to providing reasonable compensation to landowners for right-of-way or improvements that must be acquired to accommodate the proposed project. If the Department and the landowner cannot reach a mutual agreement regarding the adequacy of compensation, a condemnation proceeding will be initiated to determine the compensation.

12. Your comments have been noted.

Comment

3 of 4

April 18, 1986

Stephen C. Kologi
Chief, Preconstruction Bureau
Montana Dept of Highways
2701 Prospect Avenue
Helena, Montana 59620

M 1212 (4)
M 1299 (1)

Dear Mr. Kologi,

We thank you for information recently received relative to the proposed arterial highway construction in the Bozeman area. We appreciate the opportunity provided for input from those of us who will be adversely affected by the projects under consideration.

We recommend the selection of Alternative No. 1 (No-Build) as the best option for the proposed extension of Kagy Boulevard to 19th. Reasons for our recommendation include the following:

1. The only traffic problems in the Kagy area that might be construed as being serious are those created for a few minutes after athletic contests at Montana State University. We think it is quite likely that anyone who has time to sit for several hours and watch a ball game should also have time to sit for a few more minutes while traffic disperses. Your traffic counts support our belief that traffic congestion is not presently serious in this area.

Will traffic problems increase within, say, the next decade? Student enrollment at Montana State University has decreased from a high of about 11,000 to about 10,000 at present and is expected to decline further to about 9,000. As MSU goes, so goes Bozeman. We think traffic in town, and particularly in the area served by Kagy, will correspondingly decrease.

2. Traffic problems in the North 19th Ave.-Oak Street area are more serious than in the Kagy area. The Main Street-North Seventh-Durston areas are among the most severely impacted areas in Bozeman. These problems could be alleviated significantly by the proposed North 19th-Oak Street project. Also, unlike the Kagy area, these areas are impacted by many trucks and other commercial vehicles which need better roads. We encourage you to give this project your highest priority.

3. The Willow Way area is zoned for residential housing (RS-1). In fact, the east-west portion of Willow Way is owned by individual property owners. The proposed extension of Kagy would have the following detrimental impacts upon this residential area:

a. Traffic, noise, pollution, etc. would be markedly increased during 24 hours each day. We moved out here to AVOID these!
b. The value of houses and the numbers of prospective buyers of houses would be significantly decreased. No one in his right mind would want to raise children in a house located 35 feet from a highway.
c. Wrights' house would have to be demolished, at no small cost to taxpayers.
d. Many of the highly valued trees, requiring 30-40 years for replacement would be destroyed. The grove of shrubs and trees at Wrights' serves as an irreplaceable habitat for birds and other wildlife; the proposed extension of Kagy and the access from the north-south part of Willow Way would apparently entirely eliminate this grove.

Comment

4 of 4

e. The north-south part of Willow Way is unpaved. Increased traffic associated with the extension of Kagy would create a serious dust problem and other problems associated with traffic.

f. Access problems from private homes onto the arterial would be serious and hazardous. Parking problems for more than a minimal number of visitors, since parking on the arterial would be forbidden, would be completely hopeless.

Are you prepared to provide reasonable compensation for our losses?

4. The No-Build Option would provide time to consider other routing options for the extension of Kagy to 19th.

Respectfully submitted,

Paul Schumacher
(for) Charlene Schumacher
William L. Bryan Jr.
for Pamela Bryan
Marlene Ferguson
Clayton Ferguson
Henry Moore
Ann Moore
William Kimmersley
Nancy Kimmersley
Howard C. Murray
Martha Murray

ALL OF THE PEOPLE WHO HAVE SIGNED HERE LIVE ON ALDER COURT

Comment

Montana State University
Bozeman, Montana 59717

Division of Physical Plant

April 22, 1986

Stephen C. Kologi, P.E.
Chief, Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59620

Dear Mr. Kologi:

With regards to the Bozeman Arterials Draft Environmental Impact Statement (DEIS), Montana State University received two copies, one went to Mr. Craig Roloff and one came to the Physical Plant. All comments pertaining to MSU were provided by Mr. Roloff. I presume he sent them on to you. 1

If you have any further questions, please feel free to contact me.

Sincerely,

Edward Rice
Director

ER:rs

Date Rcvd. Precnst. 4/24/86

Act	Info	MAIL ROUTE	Attach	Initial
		30		
	✓	30 Eng. Specialties		
		31 Control Plans		
		32 Geos. Road Design		
	✓	33 Environment		
		34 Hydraulic		
		35 Surfacing Design		
		36 Traffic		
		37 Pub. Hearing		
		38 Photogrammetry		
	✓	39 Consultant Design		
	✓	File		

TELEPHONES (406)

Administration	994 2001	Facilities Dev. &(Mgmt	994 4131	Work Control Center	994-2107
Accounting	994 2004	Campus Stores	994 2098	Motor Pool	994 3670
Engineering & Utilities	994 2001	Landscape & Grounds	994 3442	Custodial Services	994 6868

Response

RESPONSE TO COMMENTS BY:

Edward Rice, Director
Division of Physical Plant
Montana State University
Bozeman, MT

1. Your comments have been noted.

Comment

RECEIVED
APR 28 1986
ROBERT PECCIA & ASSOCIATES

BOZEMAN ARTERIALS EIS
(KAGY - 19TH - OAK)

COMBINED PUBLIC HEARING ON DRAFT EIS AND LOCATION & DESIGN

APRIL 23, 1986

Please write your comments below and leave them at this meeting or mail to:

Robert Peccia & Associates
P.O. Box 4518
Helena, MT 59604

Comments will be received until May 5, 1986.

Please indicate herein your pertinent comments on the proposed projects:

May we record that we feel that Number I. priority should be placed on improving North Nineteenth clear through to Baxter Lane along with Oak to 7th. 1

Name & Address: (optional)
J W Tschache - Land Owner
Bx 716
Bozeman 59715
Mont.

Response

RESPONSE TO COMMENTS BY:

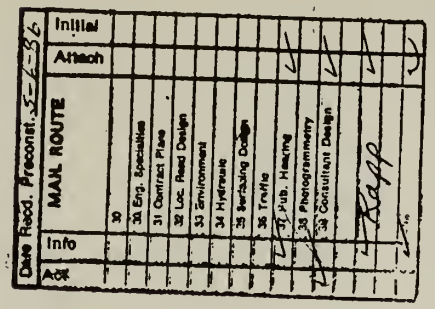
J.W. Tschache
Box 716
Bozeman, MT

1. Your comments have been noted.

Comment

1105 West Durston Road
Bozeman, MT 59715
April 29, 1986

RECEIVED
MAY 12 1986
ROBERT PECCIA & ASSOCIATES



Stephen C. Kologi, Chief
Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59602

Dear Mr. Kologi:

We are writing in reference to the February 1986 Draft Environmental Impact Statement, Bozeman Arterials, numbers M1299(1) North 19th and M1212(4) Kagy Boulevard, recently issued by the State of Montana, et al. Our northernmost boundary borders the proposed Oak Street Corridor, therefore directly impact- our property. Additionally we own approximately four blocks of frontage bounded by West Durston Road to the south, further affecting our property. This is somewhat of a unique situation from most property owners, with two noteable exceptions, the Gallatin County Resthome/Gallatin County property and the Roy Walton property directly west. To further complicate matters the western portion of our property lies in the county with the eastern portion under city jurisdiction. 1

Referring to the DEIS, studies conclude construction of the perimeter loop, Oak Street leg, will reduce present traffic on West Durston Road. This reduction, in conjunction with guarantees West Durston Road will remain in its present form as a two-lane collector is essential to an agreement of the proposed right-of-way acquisition along our northern border. Current traffic volume on Durston makes safe egress from our house difficult at best, and near impossible during peak traffic periods with particular problems associated with livestock and farm machinery. A four-lane arterial with associated increased traffic would make egress, noise, speeds, truck traffic and general volume even more hazardous. Further expansion of Durston would in our opinion, promote increased mixed and commercial use along its boundaries, which we are opposed to, having stated so formally numerous times. We cite the conditional use permit issued by the City of Bozeman for Dr. Allen's medical facility/residence and Board of Adjustment variance for the Wheeler physical fitness center/residence, both on West Durston. Additional concerns were also directed to the city in March, 1982, in reference to Dr. Robert Degnan's intention of selling the Maxey-Durston home, 1005 West Durston Road, for use as a restaurant. 2 3

Zoning and speed limits of the proposed Oak Street access seem unclear within the DEIS, inferring opposing assumptions regarding truck traffic, either directed along the proposed Oak Street-19th Avenue corridor, or as currently routed on to North Seventh Avenue-Main Street. In our opinion, the current truck route should remain, as detailed in the 1981 Bozeman Transportation Study, item 12B, carrying both local and through truck traffic, containing noise and emission pollution associated with trucks to one road system. Eliminating major truck traffic on Oak would encourage residential growth, as houses and trucks do not typically go hand in hand. 4 5

Response

RESPONSE TO COMMENTS BY:

Mary Francesca Palffy and
David James Patterson
1105 West Durston Road
Bozeman, MT

1. No response required.

2. Your comments are noted. The Bozeman Transportation Plan classifies Durston Road as a minor arterial not as a collector road and identifies a long-range improvement project (Project 12C, page 49) that will widen the roadway to 44 feet (two 12-foot travel lanes and two ten-foot shoulders) between North 19th and North Seventh Avenues. It would be impossible to "guarantee" that Durston Road will remain in its present form. If the need exists and traffic volumes on Durston Road justify an expansion of the facility, it will mostly likely be undertaken as funds become available for the project.

3. Your comments are noted.

4. Additional text identifying the design speed and speed limit for Oak Street has been added to "Part II: Alternatives, Section B. Alternatives Selected for Evaluation". The design speed for Oak Street is 45 mph and the posted speed limit is anticipated to be 35 mph. Zoning for lands along Oak Street lying outside the city and within County Zoning District One are designated AS (Agricultural - Suburban).

5. The truck route identified in the Transportation Plan was only recommended and never adopted by the City of Bozeman. It is inevitable that North 19th Avenue - Oak Street will remove some truck traffic from North Seventh Avenue and Main Street because the route is more direct and subject to less traffic conflicts. The designation of a preferred truck route through the city and the enforcement of such an ordinance is the responsibility of local government.

Comment

It is our wish the agricultural lands in the area remain in production. If this is not to be the case we view residentinl expansion as the lesser of two evils. Encouraging commercial zoning for the area would have a detrimental effect, increasing traffic, noise and visual pollution. What are the intended speed and zoning requirements associated with the proposal? Will the truck route be continued as is? With the proposed perimeter loop Oak Street leg and related secondary impact annexations of neighboring property we have become concerned about the potential increase of county and/or city property tax, in addition to city annexation of our county acreage. We strongly oppose such action, requiring written assurrance our county holdings will not be annexed unless specifically requested by us. As a matter of point, because we are not benefiting from city services regarding our city acreage in agricultural production, we would welcome deannexation of any property lying north of West Durston Road, or west of the alley between North Seventh and 8th Avenues, which is currently under city jurisdiction. 6 7

Also inter-related with general northwestern expansion due to the development of the proposed Oak Street Corridor-West Durston Road improvement is the bearing upon Eighth Avenue, running north of Durston. As general expansion occurs, pressure to develop Eighth will greaten. Owning property which fronts the length of platted Eighth to the west and a block to the east, we do not want to be put into a position of paying for street improvements unless we specifically agree. 8

If the Oak Street corridor comes to pass, we strongly recommend stringent zoning be enforced to prevent piece meal development. By this we refer to newly developed areas of Bozeman which have been dotted with malls, trailer courts, commercial business and homes, all of which lack evidence of foresight, careful planning and order. We feel a precedent needs to be established regarding further expansion of the city, if indeed expansion occurs. We specifically request if Oak Street is developed that fences and some sort of tree line be put in place to 1) protect livestock and 2) block out noise and visual pollution. We intend to stand firm on this request. 9 10

We ask that questions brought forth in this letter be addressed and will await further correspondence on the issue. We are temporarily living in Kansas, however Bozeman remains our permanent home. We intend to return within a short period of time. Our Kansas address is:

3112 Heritage Court #20
Manhattan, Kansas 66502

Sincerely yours,

Mary Francesca Palffy
David James Patterson

cc. Manager, City of Bozeman; Engineer, City of Bozeman; Board of City Commissioners; Bozeman City-County Planning Board; Gallatin County Engineer; Board of County Commissioners.

Response

6. The construction of Oak Street will provide access to a previously undeveloped area adjacent to the City of Bozeman and will undoubtedly contribute to secondary development along the arterial corridor. Landowners adjacent to North 19th Avenue - Oak Street have initiated annexation procedures and zoning changes themselves in anticipation of the benefits that improved access will provide. The public review process required by the Bozeman City-County Planning Board and the Zoning Commission is in place to ensure that future development is consistent with community goals and comprehensive plan. The decision to remove some lands along North 19th Avenue and Oak Street from agricultural production is unfortunate but was done by choice rather than necessity. The EIS process recognizes these local losses of agricultural land and requires the U.S. Department of Agriculture Soil Conservation Service to review the project relative to the provisions of the Farmland Protection Policy Act.

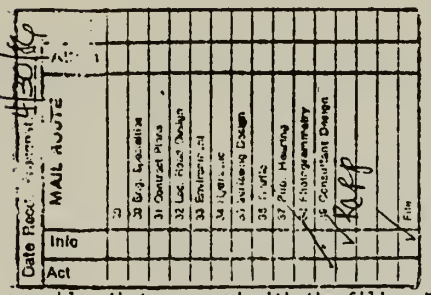
7. Your comments have been noted.

8. The authors of the EIS are unaware of any planned action by the City of Bozeman or the Montana Department of Highways to develop Eighth Avenue between Durston Road and the future Oak Street.

9. Your opinion has been noted.

10. Preliminary designs for Oak Street included fencing along all agricultural lands adjacent to the roadway.

Comment



Reviewer:

We have recently been informed of a problem that occurred with the filing date in the Federal Register regarding the recently circulated Bozeman Arterials Draft Environmental Impact Statement (DEIS). Because of that problem, the deadline for comments regarding this DEIS has been extended to May 5, 1986 and consequently it is imperative the Montana Department of Highways receive your comments by that date. Again, all comments should be send to:

Stephen C. Kologi, P.E.
Chief, Preconstruction Bureau
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59620

Dear Sirs -
I know that Bozeman needs this street desperately and I would 1
vote for it - I don't know however
if it will de-value my property.
I dread the dust and mess when 2
it is being built -

Sincerely
Vera Hauser
1232 No 8th
Bozeman Mt 59715

(Mrs. Roy Hauser)

MAL:cm:4/n

Response

RESPONSE TO COMMENTS BY:

Mrs. Roy Hauser
1232 North Eighth
Bozeman, MT

1. Conversations with Bozeman area realtors regarding the effects of previous arterial improvement projects on local property values indicated that no significant changes in property values had occurred. Appraisers for the Montana Department of Highways feel there is a potential for a slight increase in property values in the North 19th Avenue - Oak Street area due to the provision of a major access route through an undeveloped area.

2. MDOH Standard Specifications for Road and Bridge Construction contain provisions to ensure that local air and water quality are protected during the construction of the project. Compliance with all federal, state, and local regulations relating to air quality will be required and enforced.

Comment

May 2, 1986

Stephen C. Kologi
Chief, Preconstruction Bureau
Montana Dept. of Highways
2701 Prospect Avenue
Helena, Montana 59620

Dear Mr. Kologi:

In reply to your request for comments on the Kagy extension plan I am submitting the following: I recommend the NO BUILD OPTION. 1

The direct westward extension would have a detrimental impact for both the RS-1 zoned residental Willow Way and Alder Court areas as well as upon the athletic area of Montana State University.

I would recommend that any link-up to 19th Avenue be deferred until such future time that the Richard Boylan's discontinued the operation of their farm. After that time, please consider the option of linking Kagy up to 19th at the present intersection of 19th and Stucky as indicated on the enclosed memo I wrote on June 23, 1982 to members of the MSU Facilities Planning and Utilization Board. This suggestion is supported by many people in this area. 2

Stucky is now taking a significant amount of east-west traffic. By linking Kagy to 19th on Willow Way you would be creating a second traffic-blocking intersection on 19th. There would be only one major intersection on 19th if you link Kagy to 19th on Stucky. Also, traffic can flow east and west on Stucky, whereas traffic on Kagy must turn on 19th.

Response

RESPONSE TO COMMENTS BY:

Joseph M. Caprio
1801 Willow Way
Bozeman, MT

1. Your comments are noted.

2. The proposed routing of Kagy Boulevard along the southern edge of the MSU campus has been identified for nearly 30 years and is part of the Bozeman Transportation Plan, a planning document formally adopted by the Bozeman Policy Coordinating Committee in October, 1982. The local transportation planning process included public meetings where comments were solicited regarding the contents of the document. Changes to any planned or committed improvement project on Bozeman's Federal Aid Urban system must be initiated locally through the Technical Advisory and Policy Coordinating Committees. Subsequent reviews and approvals of any recommended project change would be required from the Office of the Director of the Montana Department of Highways, the Montana Highway Commission, and the Federal Highway Administration.

   The points identified in the June 23, 1982 memo to the MSU Facilities Planning and Utilization Board are well taken and would provide numerous benefits to campus areas. However, the suggested alignment of the arterial to the south via an extension of Greek Way or from South Third Avenue would force traffic flows on the roadway to make difficult and inefficient traffic maneuvers in the transition to and from the recently constructed section of Kagy Boulevard. The proximity of the existing major intersection at Kagy - Willson Avenue - South Third Avenue to a second major intersection at either Greek Way or further south on South Third Avenue as required by the suggested alignment is undesirable and would inhibit traffic flows on the perimeter arterial.

   The development of the perimeter arterial system will address several local transportation needs including: the need for traffic relief on segments of the existing street system; the need to accommodate through traffic maneuvers; and the need to connect major traffic generators in the community. The development of Kagy Boulevard in its proposed location along Willow Way will provide a direct route to Montana State University, the primary traffic generator in the southwest portion of Bozeman. The authors of the EIS feel that construction of a link between Stuckey Road and Greek Way or South Third Avenue would be less desirable for traffic to and from Montana State University and may discourage some motorists from utilizing the facility.

Comment

Among many other concerns of people in this southwest community of Bozeman about the Kagy extension is the nightmare of heavy trucking and automobile traffic being channelled through prime residental property and through the heart of the university's athletic area, with trucking being intensified by the Gallatin Canyon-Main Street-Interstate #90 line of traffic. Until Kagy on the east side of town is linked up to Interstate #90 our new hospital would also bear the unnecessary burden of this noisy-air polluting impact. 3

Thank you for this opportunity for input into plans for the Kagy extension.

Sincerely yours,

Joseph M. Caprio

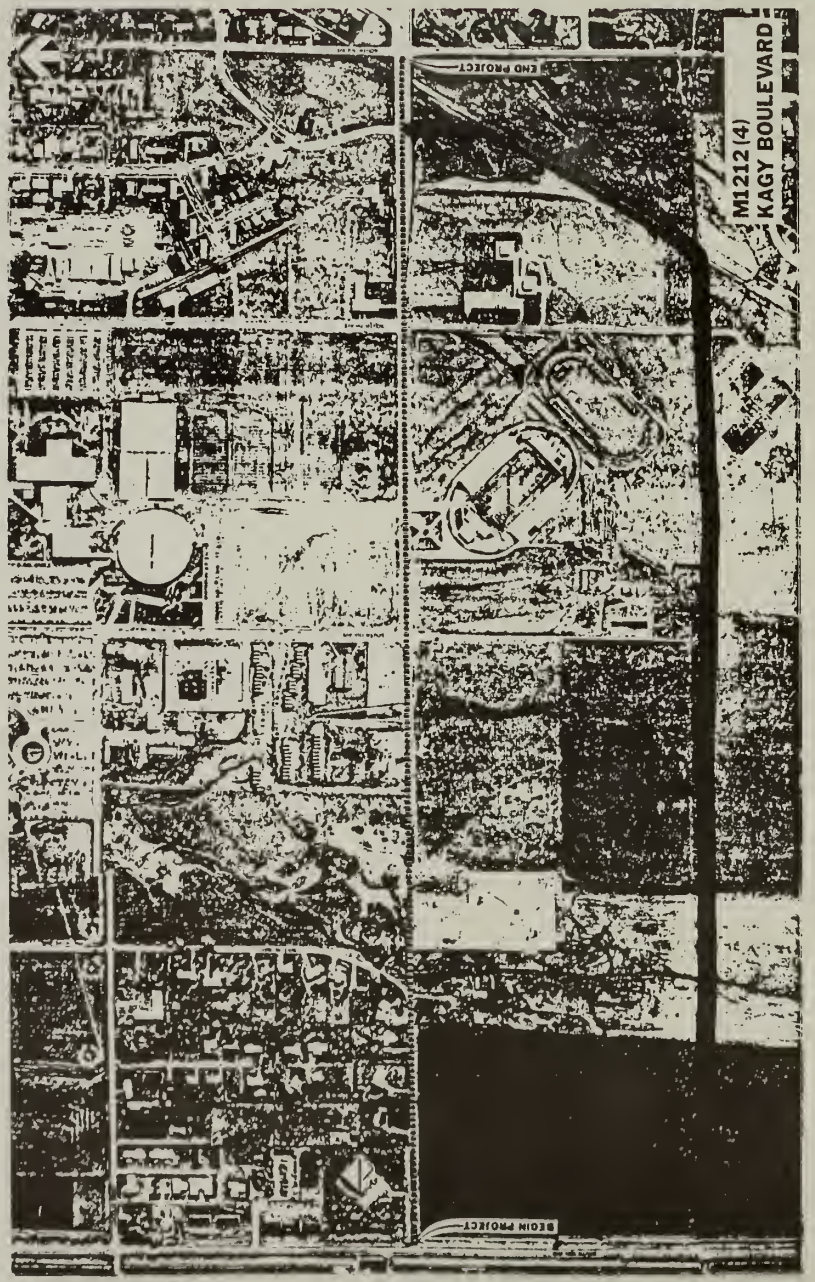
Joseph M. Caprio

Address: 1801 Willow Way
Bozeman, Montana 59715

Enclosures

Response

3. Your opinion is noted. It is unlikely that heavy truck traffic will utilize the Highland Boulevard - Kagy Boulevard section of the perimeter arterial system as a primary through route from I-90 to U.S. 191 because more direct alternate routes exist to accommodate such movements. Currently, there are no planned or committed improvement projects that will provide a direct link between Kagy Boulevard and I-90.



Comment

MSU

DEPARTMENT OF PLANT & SOIL SCIENCE

COLLEGE OF AGRICULTURE MONTANA STATE UNIVERSITY, BOZEMAN 59717

MEMORANDUM

June 23, 1982

TO: University Facilities Planning and Utilization Board Members

FROM: Joseph M. Caprio, Professor, MSU

RE: MSU Phase One Maater Plan

This letter is to describe a suggestion concerning the MSU Phase 1 Master Plan (May 1, 1982). I read about the Plan in the newspaper, attended the June 14th City Commission hearing on the Plan and have read parts of the Master Plan itself.

My interest partially relates to my involvemnt in land use planning while on leave from MSU with CSIRO Land Use Research at Canberra, Australia and my concern for air quality. The Australians give very serious professional consideration to air quality in their city planning.

Arguments for developing a non-motorized pedestrian centered zone on the MSU campus are not only greater pedestrian safety but also the improvement in air quality as well as a reduction in the noise of moving vehicles. We know that automobile fumes are a highly potent health hazard.

My office has been reporting daily air quality measurements at MSU to the local news media for several years. At certain times during the past decade continuous measurements of air quality were made at Lewis Hall by Dr. Eugene Sharp. Degradation of air quality was regularly registered before and after evening basketball games at the Field House.

Concerning the traffic channeling plan itself, I am questioning the impact of heavy traffic on Kagy in the vicinity of the stadium, the athletic field, and the track. I have used the athletic field some distance in from Kagy and, even with the present relatively low volume of traffic, I am frequently annoyed by the fumes of passing vehicles. There is considerable student activity on the athletic field and both students and faculty are jogging along Kagy. The heavy automobile traffic would be directed right through the heart of the athletic area.

I would suggest that you consider channeling east-west city traffic from Kagy through the planned Greek Way extension near the Museum, past Summit Engineering and through Stuckey to 19th, and/or directly west from South Third to 19th on Stuckey. (See attached map.)

This would also link up with the anticipated business and high technology areas along Stuckey and 19th Avenues. Such channeling of east-west city traffic would also be more conducive for residential living

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Comment

outlined in your plans for areas adjacent to Kagy between 11th and 19th avenues.

The probable advantsges are:

1. Reduction in trsffic through the campus providing increased student safety.

2. No need for walkways or tunnels for acceas to the stadium and track.

3. Reduced noise and air pollution by locating heavy east-west city traffic more to the south.

4. Less traffic on Kagy to the west of the Campus which is more consistent with planned residential use (R-4 and RS-1).

5. Better access to planned on or near-Stuckey business and technology zones (TR and B-1) and Summit Engineering.

6. Improved access to the stadium and the field house from the south side via Stuckey on 11th Avenue with potential parking to the west and aouth of the stadium.

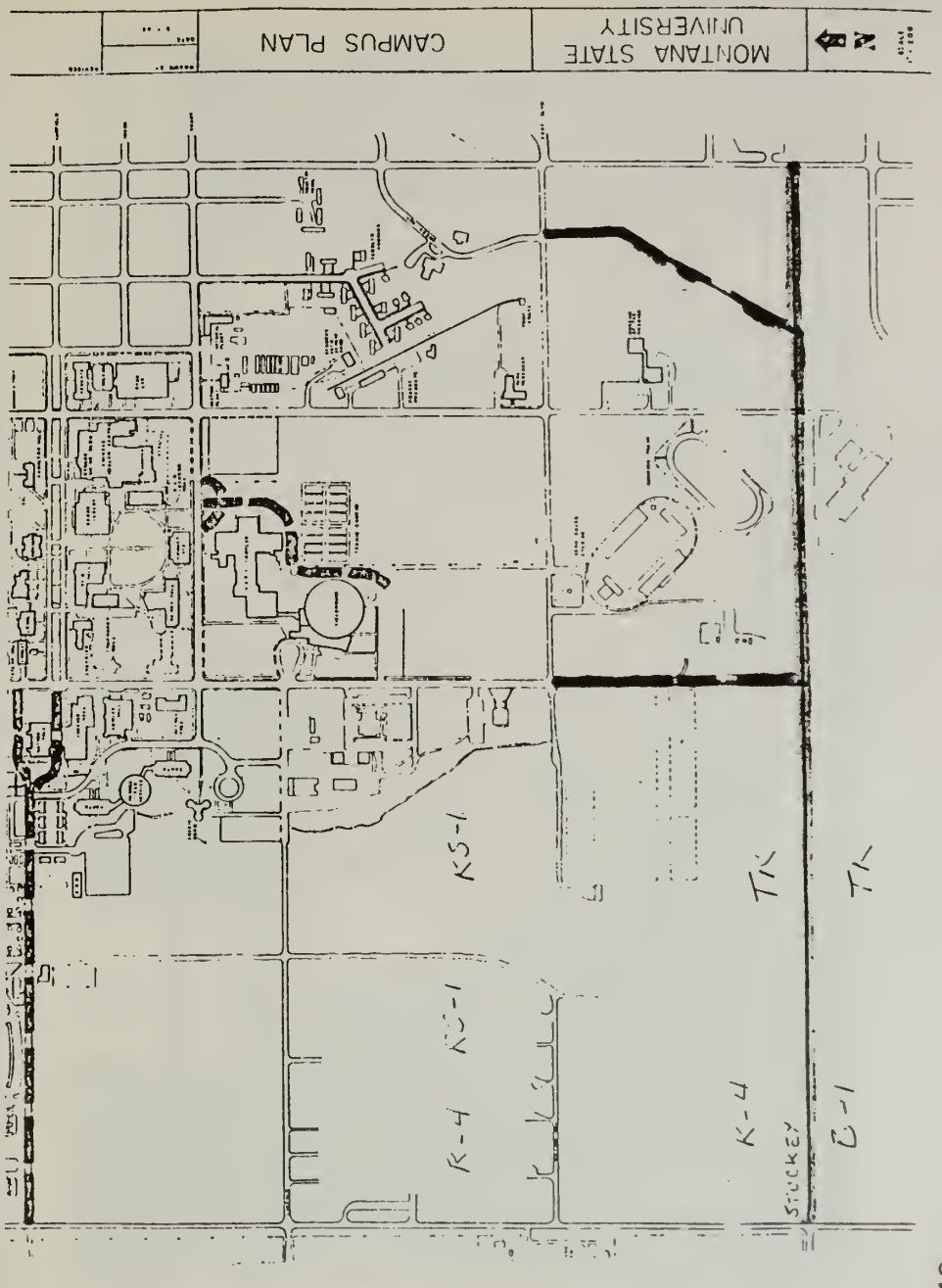
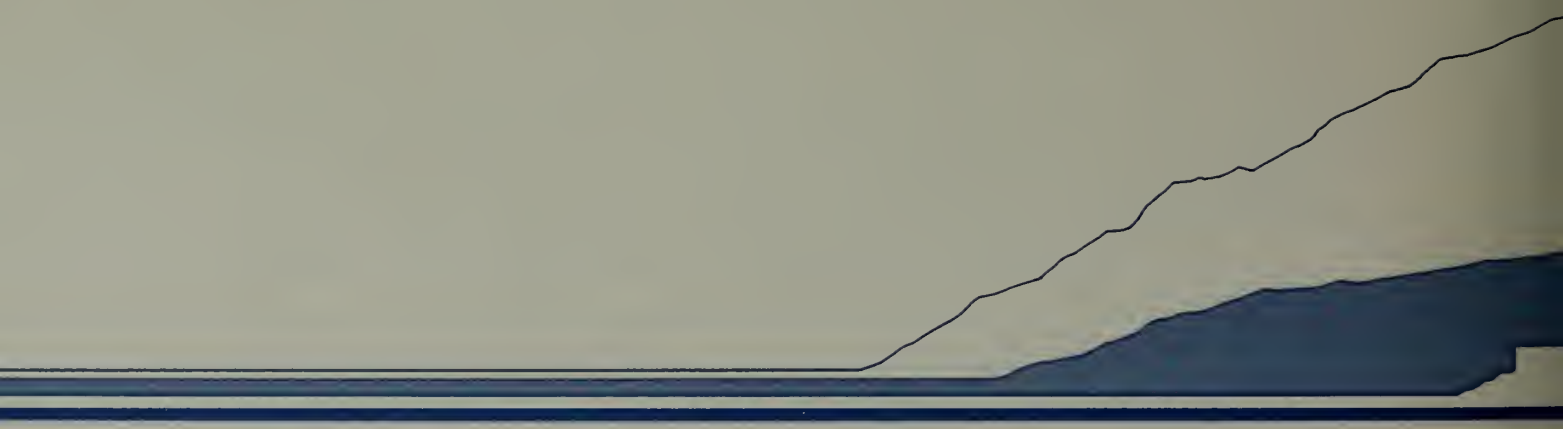
7. An emphasis on the general unity of MSU-owned land which leaves more options open for future use changes.

The development of encroaching highways has produced undesirable impacts upon other university campuses. It would be most desirable if thia situation can be avoided here.

The several colleagues with whom I have discussed this are favorable to the concept. I hope that these comments will be of some help to you in developing your Phase 2 plan.

JMC/pla

Enclosure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